

**UNITED STATES DEPARTMENT OF AGRICULTURE  
ANIMAL AND PLANT HEALTH INSPECTION SERVICE  
WILDLIFE SERVICES**

**ENVIRONMENTAL ASSESSMENT**

**for the**

**Management of Coyote, Dog, and Red Fox Predation on Livestock in the Commonwealth  
of Virginia.**

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**In Conjunction With:**

**Virginia Department of Game and Inland Fisheries**

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## ACRONYMS

ADC	Animal Damage Control
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BO	Biological Opinion
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DOJ	Department of Justice
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
IPM	Integrated Pest Management
IWDM	Integrated Wildlife Damage Management
MIS	Management Information System
MOU	Memorandum of Understanding
NASS	National Agricultural Statistics Service
NEPA	National Environmental Policy Act
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
FWS	U.S. Department of Interior, Fish and Wildlife Service
VAC	Virginia Annotated Code
VASS	Virginia Agricultural Statistics Service
VDACS	Virginia Department of Agriculture and Consumer Services
OPM	Office of Pesticide Management
VA	Virginia
VCCDCP	Virginia Cooperative Coyote Damage Control Program
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
WS	Wildlife Services

**NOTE:** On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The terms Animal Damage Control, ADC, Wildlife Services, and WS are used synonymously throughout this Environmental Assessment.

## CHAPTER 1: PURPOSE AND NEED FOR ACTION

### 1.1 Introduction

The United States Department of Agriculture (USDA) is authorized and directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services (WS) program is the Animal Damage Control Act of March 2, 1931, as amended (7 U.S.C. 426-426c; 46 Stat. 1468) and the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988 (P.L. 100-202)(see Section 1.8). WS activities are conducted in cooperation with other federal, state and local agencies; and private organizations and individuals. Federal agencies, including the United States Department of Interior, Fish and Wildlife Service (USDI, FWS), recognize the expertise of WS to address wildlife damage issues.

Wildlife damage management, or control, is defined as the alleviation of damage or other problems caused by or related to the presence of wildlife. It is an integral component of wildlife management (Leopold 1933, The Wildlife Society 1990, Berryman 1991). The WS program uses an Integrated Wildlife Damage Management (IWDM) approach (sometimes referred to as Integrated Pest Management or IPM) in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1, 1-7 of The Animal Damage Control Program Final Environmental Impact Statement (USDA 1997 revised). These methods include the alteration of cultural practices as well as habitat and behavioral modification to prevent damage. The reduction of wildlife damage may also require that the offending animal(s) be removed or that populations of the offending species be reduced through lethal methods.

WS mission is to “provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and to safeguard public health and safety.” This is accomplished through:

- A) training of wildlife damage management professionals;
- B) development and improvement of strategies to reduce economic losses and threats to humans from wildlife;
- C) collection, evaluation, and dissemination of management information;
- D) cooperative wildlife damage management programs;
- E) informing and educating the public on how to reduce wildlife damage and;
- F) providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1997a).

This Environmental Assessment (EA) evaluates ways by which this responsibility can be carried out to resolve predation on livestock by coyotes, dogs, and red fox in the Commonwealth of Virginia (VA).

WS is a cooperatively funded and service oriented program. Before any operational wildlife damage management is conducted, *Agreements for Control* or *WS Work Plans* must be completed by WS and the land owner/administrator. WS cooperates with private property owners and managers and with appropriate public land and wildlife management agencies, as requested, with the goal of effectively and efficiently resolving wildlife damage problems in compliance with all applicable federal, state, and local laws.

Individual actions on the types of sites encompassed by this analysis are categorically excluded under the Animal and Plant Health Inspection Service (APHIS) Implementing Regulations for compliance with the National Environmental Policy Act (NEPA) (7 CFR 372.5(c)). APHIS Implementing Regulations also provide that all technical assistance furnished by WS is categorically excluded (7 CFR 372.5(c)) (60 Federal Register 6,000-6,003 (1995)). Do to interest in WS activities, WS has prepared this EA to assist in planning coyote (*canis latrans*), dog (*canis familiaris*), and red fox (*vulpes vulpes*) damage management activities under the Virginia Cooperative Coyote damage Control Program (VCCDCP) and to clearly communicate with the public the analysis of cumulative impacts for a number of issues of concern in relation to alternative means of meeting needs for such

management in the State. This analysis covers WS plans for current and future VCCDCP actions wherever they might be requested within Virginia.

Biological carrying capacity is the land or habitat's limit for supporting healthy populations of wildlife without degradation to the animals' health or their environment over an extended period of time (Decker and Purdy 1988). Wildlife acceptance capacity, or cultural carrying capacity, is the limit of human tolerance for wildlife or the maximum number of a given species that can coexist compatibly with local human populations (Decker and Purdy 1988). These terms are especially important in urban areas because they define the sensitivity of a local community to a specific wildlife species or problem. For any given damage situation, there will be varying thresholds by those directly and indirectly affected by the damage. This threshold of damage is a primary limiting factor in determining the wildlife acceptance capacity. While Virginia has a biological carrying capacity to support more than the current number of coyotes, the wildlife acceptance capacity is often much lower. Red fox may have reached biological carrying capacity in Virginia (VDGIF pers.comm.). Once the wildlife acceptance capacity is met or exceeded, people will begin to implement population or damage reduction methods, including lethal management methods, to alleviate property damage and public health or safety threats (Loker et al. 1999).

This EA documents the analysis of the potential environmental effects of the proposed program. This analysis relies on existing data contained in published documents, primarily the Animal Damage Control Final Environmental Impact Statement (USDA 1997 revised) to which this EA is tiered. These WS activities will be undertaken in compliance with relevant laws, regulations, policies, orders, and procedures including the Endangered Species Act (ESA).

A Notice of Availability of the (pre-decisional) EA was published consistent with APHIS NEPA procedures to allow interested parties the opportunity to obtain and review the document and comment on the proposed management activities.

## 1.2 Purpose

The purpose of this EA is to analyze the effects of WS activities in Virginia to reduce predation by coyotes, dogs, and red fox on sheep, goats, and cattle and other livestock. The livestock industries in Virginia most affected by mammalian predators are sheep, goat, and cattle. According to the Virginia Agricultural Statistics Service (VASS) (1998), the sheep industry is primarily located along and west of the Blue Ridge Mountains, the goat industry is in its infancy with the greatest number of producers believed located along and west of the Blue Ridge Mountains. The cattle industry is located primarily west of the Blue Ridge Mountains and in the northern and southern Piedmont regions.

Coyotes are non-indigenous wild canids originally from the short grass prairie regions of North America (Parker 1995). They have expanded their range eastward taking advantage of a niche left vacant when red wolves (*canis rufus*) and gray wolves (*canis lupus*) were extirpated (Parker 1995). Coyotes are believed to have first colonized Virginia around 1979 or 1980 (Tomsa 1991, Parker 1995, Moore and Parker 1992). Coyotes are the foremost predator of livestock in Virginia, followed by dogs. Historically, feral and free-roaming dogs have been livestock producers primary predator problem. Today, dog predation on livestock would include pet dogs, feral dogs, and hybrids wolf/coyote/dog. Red fox are native to North America, however they were believed native to spruce-fir forests (Samuel and Nelson 1982, Linzey 1998). European red fox were brought to North America and released by colonist in the 1600's for sport. Red fox in Virginia probably are a hybrid of North American and European red fox (Samuel and Nelson 1982, Linzey 1998). While red or gray fox both may prey on livestock, it appears red fox are primarily responsible for livestock predation in Virginia.

### 1.3 Need For Action

Coyote depredations were recognized as a potentially serious threat to Virginia's livestock industries in the mid 1980's. As a result, the VCCDCP was created in 1990. The VCCDCP provides the necessary technical assistance and operational assistance in identifying and abating coyote, dog, and fox predation on livestock. As a measure of magnitude, the VCCDCP assisted 45 sheep farms with losses of 555 sheep killed by coyotes in FY 1990. This compares to 84 sheep farms assisted with losses of 448 sheep killed by coyotes in FY 1999. The VCCDCP has kept losses down per farm; however, the coyote population continues to expand (Virginia Department of Game and Inland Fisheries (VDGIF), unpubl. data) and affect additional farms each year.

#### 1.3.1 Summary of Proposed Action

The proposed action is to continue the current portion of the WS program in Virginia that responds to requests for the VCCDCP to protect sheep, goats, and cattle in Virginia. An Integrated Wildlife Damage Management (IWDM) approach would be implemented which would allow the use of any legal technique or method, used singly or in combination, to meet the requestor needs for resolving conflicts with coyotes, dogs, and red fox (Appendix B). Cooperators requesting assistance would be provided with information regarding the use of effective nonlethal and lethal techniques. The VCCDCP coordinates with county extension agents to conduct educational workshops for local livestock producers each year going over all legal nonlethal and lethal methods to protect livestock. Lethal methods used by WS would include shooting, calling and shooting, trapping, snaring, the use of dogs, M-44's, Livestock Protection Collars (LPCs), and gas cartridges. Nonlethal methods used by WS may include strobe sirens to temporarily repel mammalian predators from bedding areas and assistance in placing guard dogs. Most nonlethal methods are best implemented by the livestock producer. Non-lethal methods recommended by WS may include: guard dogs and llamas; fencing, moving livestock to other pastures, shed lambing/birthing, night penning, habitat alteration, herders, and scare devices. A few livestock producers also have the skills and time to implement lethal control methods (e.g., shooting, snaring, trapping) to reduce predation. VCCDCP by WS would be allowed in the State, when requested, on private property or public lands (e.g., state) where a need has been documented and upon completion of an *Agreement for Control*. All management actions would comply with appropriate federal, state, and local laws.

#### 1.3.2 Need to Protect Livestock from Coyotes, Dogs, and Foxes

Livestock is a very important industry in Virginia with 1999 receipts from marketing cattle and sheep totaling \$328 million (Virginia Agricultural Statistics Service [VASS] 2000). Livestock inventories in Virginia include 1.6 million head of cattle and 61,000 head of ewes and lambs on January 1, 2000. While sheep inventories have stabilized in the past 3 years, sheep inventory is down 63% from 1990 (VASS 2000). The goat industry is not surveyed by VASS or the National Agricultural Statistics Service (NASS), therefore the number of goats in Virginia is unknown.

Livestock predation by coyotes, dogs, or red fox includes damage primarily to sheep, goats, and cattle (Table 1-1, Table 1-2, Table 1-3). Infrequently, foals and range raised fowl are preyed upon by coyotes, dogs, or foxes. In Virginia, coyotes accounted for 68% of all predator-killed calves and 76% of all predator-killed lambs in 1998 (NASS 1999). Additional costs associated with livestock protection include labor, lost genetic stock, time (in months or years) to replace killed animals, implementation of wildlife management practices to reduce damage or the threat of damage, and long distance calls to government agencies to seek assistance.

Table 1-1. Livestock losses involving coyotes, dogs, or red fox predation reported to the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services Program from May 1992 through September 1999.

<u>predator</u>	<u>damage</u>	<u>Livestock resource</u>			
		<u>sheep</u>	<u>cattle</u>	<u>goats</u>	<u>other<sup>1</sup></u>
coyotes	killed	2267	184	346	238
	injured	205	15	1	2
dog	killed	305	26	3	801
	injured	57	15	1	1
red fox	killed	13	0	11	61
	injured	2	0	6	0
Total		2849	240	368	1103

1. Includes foals, chickens, turkeys, ducks, donkey, and geese.

Table 1-2. Number of sheep farms reporting sheep killed and injured by coyotes and receiving Wildlife Services assistance by Fiscal Year.

	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>
sheep farms asstd.	45	56	34	24	41	28	56	49	72	84	67
sheep killed/injured	555	469	623	404	363	191	402	250	229	448	337

Table 1-3. Number of cattle, goats, and sheep killed and injured by coyotes reported to the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services program by fiscal year.

	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>
cattle killed/injured	2	15	14	8	13	22	24	15	17	67	33
goats killed/injured	0	36	3	16	7	13	0	14	53	249	178
sheep killed/injured	555	469	623	404	363	191	402	250	229	448	337



#### **1.3.2.1 Impacts on the Sheep Industry**

The NASS (1999) reported 811 sheep and lambs killed by coyotes, dogs, and red foxes on 94 sheep farms surveyed in Virginia in 1998. The lost value of these sheep totaled \$78,667 with an average market value at \$97 per head (VASS 1999). During FY1999, 448 sheep on 84 sheep operations were reported and/or confirmed killed by coyotes to the VCCDCP (Management Information System [MIS] 1999). The sheep losses reported to and/or verified by WS on farms from FY 1990 through FY 1999 are summarized in (Table 1-2). The number of sheep operations requesting assistance to reduce coyote, dog and red fox damage increased from 45 operations in FY 1990 to 84 operations in FY 1999 (MIS 1999).

Sheep and lambs remain vulnerable to predation throughout the year, particularly from coyotes, (Henne 1977, Nass 1977, 1980, Tigner and Larson 1977, O’Gara et al. 1983). In Virginia, 128 sheep and lambs were reported killed by dogs in 1998 (NASS 1999). Lambs are vulnerable to red fox predation during the early stages of spring and fall lambing seasons. NASS (1999) reports 25 lambs killed by red foxes in Virginia during 1998.

#### **1.3.2.2 Impacts on the Goat Industry**

During FY 1999, 249 goats were reported and verified killed by coyotes on 13 livestock farms in Virginia (Table 1-3) (MIS 1999). The lost value of these goats is estimated at \$24,000. This represented a 370% increase from reported and verified losses from the previous year.

Smaller kid goats in small groups of goats (<30) are usually selectively preyed upon by coyotes (Windberg et. al 1997). In Virginia, the red fox is also a major predator of small kid goats and pygmy goats. Red fox and coyotes may repeatedly kill small goats and take them to a den of pups.

#### **1.3.2.3 Impacts on the Cattle Industry**

Calf depredations by coyotes are a growing concern among producers, particularly in southwest Virginia (Table 1-3). NASS surveys (1992, 1996, 2001) of cattle predator loss indicated an increasing number of coyote/calf predation in Virginia from 700 calves in 1991, 900 calves in 1995, to 1000 calves in 2000. A survey of Virginia WS clients in 1998 shows 93 cattle reported killed by coyotes on 174 livestock farms (NASS 1999). The average market value was \$480 per head in 1998 placing the total loss of these 93 cattle at \$44,640.00 (NASS 1999). Cattle and calves are most vulnerable to predation at calving time and less vulnerable as they get older and larger (Shaw 1977, 1981, Horstman and Gunson 1982). In Virginia, dogs were responsible for 10 cattle/calf depredations in 1998 on farms assisted by WS (NASS 1999).

#### **1.3.2.4 Impacts on Other Livestock**

In Virginia, coyotes, red fox, and dogs have attacked, killed, or injured other livestock including, foals, range raised fowl, and hogs (Table 1-1). The frequency of these occurrences has been low; however, sometimes large numbers of livestock (e.g. fowl) were killed during each occurrence.

### **1.3.3 Summary of Coyote, Dog, and Red Fox Predation on Livestock**

WS (VCCDCP) provided damage reduction services to more than 321 livestock operations requesting assistance with coyote, dog, and red fox predation on livestock from July 1990 through September 1999. The VCCDCP also provided technical assistance to these livestock operations and others that requested technical assistance only. Virginia WS instructed livestock producers and the public by teaching more than 4,000 persons at 86 workshops from May 1990 through September 1999. The need exists for effective reduction of predation associated with coyotes, dogs, and red fox on livestock because livestock producers lack expertise,

resources, and specialized equipment to effectively reduce damage. They also do not have the appropriate certifications to use some methods (i.e., M-44, LPC). Livestock producers also have limited time which can be devoted to developing expertise to resolve livestock predation problems. Large livestock producers also need to efficiently use large acreage to cost effectively raise livestock for profit. The large number of animals raised by large livestock producers may prohibit effective use of some nonlethal methods (e.g., night penning) because of labor, time constraints, and disease concerns.

Coyote, dog, and red fox predation reduction is very complex due to assisting multiple property owners; involvement of local, state, and federal agencies when implementing an IWDM program; technical expertise needed to capture wild animals; and restrictions of federal, state, and local statutes. Also, mammalian predator management to protect livestock is complex because of the federal responsibility to protect threatened and endangered (T&E) species while fulfilling legislative obligations. Some coyote, dog, and red fox predation damage management methods can best be implemented by the WS program, others by the livestock producer. Legal restrictions prevent livestock producers from using some tools (e.g., M-44's and LPCs) in Virginia.

## **1.4 RELATIONSHIP OF THIS ENVIRONMENTAL ASSESSMENT TO OTHER ENVIRONMENTAL DOCUMENTS**

**1.4.1 ADC Programmatic Environmental Impact Statement.** WS has issued a Final Environmental Impact Statement (FEIS) on the national APHIS/WS program (USDA 1997). This EA is tiered to the FEIS. Pertinent information available in the FEIS has been incorporated by reference into this EA.

**1.4.2 USDA-APHIS-WS Environmental Assessment for the Management of coyote, dog, and fox predation on livestock in the Commonwealth of Virginia.** This is the EA by which WS has conducted coyote, dog, and fox damage management activities in Virginia since 1998. This new EA, "Management of coyote, dog, and red fox predation on livestock in the Commonwealth of Virginia", will supercede the 1998 document.

## **1.5 DECISION TO BE MADE**

Based on the scope of this EA, the decisions to be made are:

- Should VCCDCP as currently implemented by the WS program be continued in Virginia?
- If not, how should WS fulfill its legislative responsibilities for reducing coyote, dog, and red fox predation on livestock in Virginia?
- Might the continuing of WS current program of VCCDCP have significant impacts requiring preparation of an Environmental Impact Statement (EIS)?

## **1.6 RELATIONSHIP OF AGENCIES DURING PREPARATION OF THE EA**

Based on agency relationships, Memorandums of Understanding (MOUs) and legislative authorities, Virginia WS is the lead agency for this EA, and therefore responsible for the scope, contents and decisions made. The VDGIF and VDACS contributed input throughout the EA preparation to ensure an interdisciplinary approach in compliance with NEPA, and agency mandates, policies, and regulations.

## **1.7 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS**

### **1.7.1 Actions Analyzed.**

This EA evaluates coyote, dog, and red fox damage management by WS to protect livestock on private land or public facilities within Virginia wherever such management is requested from the WS program.

### **1.7.2 Period for Which this EA is Valid.**

This EA will remain valid until WS determines that new needs for action or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document will be reviewed and revised as necessary. This EA will be reviewed each year to ensure that it is complete and still appropriate to the scope of the VCCDCP activities.

### **1.7.3 Site Specificity.**

This EA analyzes potential impacts of WS VCCDCP activities that would or could occur at private property sites or at public facilities within Virginia. Because the proposed action is to continue the current program, and because the current program's goal and responsibility is to provide service when requested within the constraints of available funding and personnel, it is conceivable that VCCDCP activity by WS could occur anywhere in the State. Thus, this EA analyzes the potential impacts of such efforts wherever and whenever they might occur as part of the current program. The EA emphasizes significant issues as they relate to specific areas whenever possible. However, the substantive issues that pertain to the various types of coyote, dog, and red fox predation on livestock and resulting management are the same, for the most part, wherever they occur, and are treated as such. The substantive issues analyzed in this EA were effects on coyote and red fox populations; effects on nontarget wildlife populations, including T & E species; effects on dogs; effects on human health and safety; and impacts to stakeholders, including aesthetics. The standard WS Decision Model (Slate et al. 1992) and WS Directive 2.105 are the routine thought process that is the site-specific procedure for determining methods and strategies to use or recommend for individual actions conducted by WS in the state (See USDA 1997, revised, Chapter 2 and Appendix N for a more complete description of the WS Decision Model and examples of its application). Decisions made using this process would be in accordance with any mitigation measures and standard operating procedures (SOP) described herein and adopted or established as part of the decision.

## **1.8 AUTHORITY AND COMPLIANCE**

### **1.8.1 Authority of Federal and State Agencies in Coyote, Dog, and Red Fox Damage Management in the Commonwealth of Virginia<sup>1</sup>**

#### **1.8.1.1 WS Legislative Authority**

The primary statutory authority for the WS program is the Animal Damage Control Act of 1931 (7 U.S.C. 426-426c; 46 Stat. 1468), which provides that:

*The Secretary of Agriculture is authorized and directed to conduct such investigations, experiments, and tests as he may deem necessary in order to determine, demonstrate, and promulgate the best methods of eradication, suppression, or bringing under control on national forests and other areas of the public domain as well as on State, Territory or privately owned lands of mountain lions, wolves, coyotes, bobcats, prairie dogs, gophers, ground squirrels, jackrabbits, brown tree snakes and other animals injurious to agriculture, horticulture, forestry, animal husbandry, wild game animals, furbearing animals, and birds, and for the protection of stock and other domestic animals through*

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<sup>1</sup> See Chapter 1 of USDA (1997, revised) for a complete discussion of federal laws pertaining to WS.

*the suppression of rabies and tularemia in predatory or other wild animals; and to conduct campaigns for the destruction or control of such animals. Provided that in carrying out the provisions of this Section, the Secretary of Agriculture may cooperate with States, individuals, and public and private agencies, organizations, and institutions."*

Since 1931, with the changes in societal values, WS policies and programs place greater emphasis on the part of the Act discussing "*bringing (damage) under control*," rather than "*eradication*" and "*suppression*" of wildlife populations. In 1988, Congress strengthened the legislative authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

*"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammal and bird species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."*

#### **1.8.1.2 Virginia Department of Agriculture and Consumer Services Legislative Mandate**

VDACS has the statutory authority to manage damage to agriculture and property, and to protect human health and safety from damage involving birds (VAC §Title 3.1 - 1011). VDACS also was granted damage management authority on coyotes by an appropriation act in the General Assembly in 1990. VDACS currently has a MOU with WS which establishes a cooperative relationship between WS and VDACS, outlines responsibilities, and sets forth annual objectives and goals of each agency for resolving wildlife damage management conflicts in Virginia.

#### **1.8.1.3 Virginia Department of Game and Inland Fisheries Legislative Mandate**

The VDGIF, under the direction of the Governor-appointed Board of Directors, is specifically charged by the General Assembly with the management of the state's wildlife resources. Although many legal mandates of the Board and the Department are expressed throughout the Code of Virginia, the primary statutory authorities include wildlife management responsibilities (VAC §§29.1-103), public education charges (VAC §§29.1-109), law enforcement authorities (VAC §§29.1-109), and regulatory powers (VAC §§29.1-501). In 1990, the Board of Directors adopted mission statements to help clarify and interpret the role of VDGIF in managing the wildlife resources of Virginia.

They are:

To manage Virginia wildlife and inland fisheries to maintain optimum populations of all species to serve the needs of the Commonwealth;

To provide opportunity for all to enjoy wildlife, inland fisheries, boating and related outdoor recreation; and

To promote safety for persons and property in connection with boating, hunting, and fishing.

VDGIF currently has a MOU with WS. This document establishes a cooperative relationship between WS and VDGIF, outlines responsibilities, and sets forth annual objectives and goals of each agency for resolving wildlife damage management conflicts in Virginia.

### **1.8.2 COMPLIANCE WITH OTHER FEDERAL LAWS.**

Several other federal laws authorize, regulate, or otherwise affect WS wildlife damage management. WS complies with these laws, and consults and cooperates with other agencies as appropriate.

#### **1.8.2.1 National Environmental Policy Act (NEPA)**

WS prepares analyses of the environmental impacts of program activities to meet procedural requirements of NEPA. This EA meets the NEPA requirement for the proposed action in Virginia. When WS operational assistance is requested by another federal agency, NEPA compliance is the responsibility of the other federal agency. However, WS could agree to complete NEPA documentation at the request of the other federal agency.

#### **1.8.2.2 Endangered Species Act (ESA)**

It is federal policy, under the ESA, that all federal agencies shall seek to conserve T&E species and shall utilize their authorities in furtherance of the purposes of the ESA (Sec.2(c)). WS conducts Section 7 consultations with the FWS to use the expertise of the FWS to ensure that *"any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency shall use the best scientific and commercial data available"* (Sec.7(a)(2)). WS obtained a Biological Opinion (BO) from FWS in 1992 describing potential effects on T&E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, revised, Appendix F). WS initiated an informal Section 7 consultation for the proposed coyote, red fox, and dog damage management program.

#### **1.8.2.3 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)**

FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA. All chemical methods used or recommended by the WS program in Virginia are registered with and regulated by the EPA and VDACS, Office of Pesticide Management (OPM) and are used by WS in compliance with labeling procedures and requirements.

#### **1.8.2.4 National Historic Preservation Act (NHPA) of 1966 as amended**

The NHPA 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that can result in changes in the character or use of historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian Tribes to determine whether they have concerns for traditional cultural properties in areas of these federal undertakings. WS actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties. WS activities as described under the proposed action do not cause ground disturbances nor do they otherwise have the potential to significantly affect visual, audible, or atmospheric elements of historic properties and are thus not undertakings as defined by the NHPA. In those cases, the officials responsible for management of such properties would make the request and would have decision-making authority over the methods to be used. WS has determined VCCDCP actions are not undertakings as defined by the NHPA because such actions do not have the potential to result in changes in the character or use of historic properties. A copy of this EA is being provided to the Chickahominy, Mattaponi, and Pamunkey American Indian tribes in the state to allow them opportunity to express any concerns that might need to be addressed prior to a decision.

#### **1.8.2.5 Environmental Justice and Executive Order 12898 - “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.”**

Executive Order 12898, entitled, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental Justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. It is a priority within APHIS and WS. Executive Order 12898 requires Federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898. WS personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations.

### **1.8.3 COMPLIANCE WITH OTHER STATE LAWS.**

#### **1.8.3.1 Virginia Comprehensive Animal Laws, (coyotes)**

This law (VAC§§3.1-796.67:1) directs the Commissioner of Agriculture and Consumer Services to enter into agreements with local, state, and federal agencies or other persons for the control of coyotes which pose a danger to agricultural animals.

#### **1.8.3.2 Virginia Comprehensive Animal Laws, (Dogs killing, injuring, or chasing livestock or poultry)**

This law (VAC§§3.1-796-116) allows any person to kill a tagged or untagged dog in the act of killing, injuring, or chasing livestock.

#### **1.8.3.3 Possession, Transportation, and Release of Wildlife by Authorized Persons**

This regulation (4 VAC§§ 15-30-50) authorizes employees of federal wildlife management agencies and local animal control officers in the performance of their duties to take problem wildlife in the Commonwealth of Virginia.

## **CHAPTER 2: ISSUES**

Chapter 2 contains a discussion of the issues, including issues that will receive detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues that have driven the development of mitigation measures and/or SOP, and issues that will not be considered in detail, with rationale. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues used to develop mitigation measures. Additional description of affected environments will be incorporated into the discussion of the environmental impacts in Chapter 4.

### **2.1 ISSUES**

The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on Coyote and Red Fox Populations
- Effects on Nontarget Wildlife Populations, including T&E Species
- Effects on Dogs
- Effects on Human Health and Safety
- Impacts to Stakeholders, including Aesthetics

### **2.2 ISSUES ADDRESSED IN THE ANALYSIS OF ALTERNATIVES**

#### **2.2.1 Effects on Coyote and Red Fox Populations**

A common concern among members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. The target species selected for analysis in this EA are the eastern coyote and red fox of which a minimal number of individuals are likely to be killed by WS use of lethal damage management methods under the proposed action in any one year.

#### **2.2.2 Effects on Nontarget Wildlife Populations, including T&E Species**

A common concern among the public and wildlife professionals, including WS personnel, is the impact of damage management methods and activities on nontarget species, particularly T & E Species. WS SOPs include measures intended to mitigate or reduce the effects on nontarget species populations and are presented in Chapter 3.

Special efforts are made to avoid jeopardizing T&E Species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the FWS under Section 7 of the ESA concerning potential impacts of VCCDCP methods on T&E species and has obtained a BO (USDI 1992). For the full context of the BO, see Appendix F of the USDA (1997 revised, Appendix F).

The Virginia WS program has reviewed the proposed action to evaluate potential impacts of the program to federally listed Threatened and Endangered (T&E) species occurring within the state. WS obtained a copy of the list of federal T&E species for Virginia from the USFWS's web site on November 29, 2001 and the potential impacts of the VCCDCP to each species was considered. Additional information from the VDGIF's website (November 30, 2001), and from Terwilliger (1991) and Terwilliger and Tate (1995) was used to evaluate the potential impacts on T&E species. We concluded that the proposed VCCDCP would have no effect on federally or state listed T&E species in Virginia. We contacted the FWS, Region 5 office on November 26, 2001, and were instructed to follow the 1992 biological opinion because similar livestock

protection programs were addressed in that biological opinion (P. Nickerson, FWS, pers. commun.). In contrast to adverse impacts on nontarget animals from direct take by VCCDCP methods, some nontarget species may actually benefit from VCCDCP. Coyotes, dogs, and red fox are predators and may feed on other birds and mammals. An example is the benefit to federally threatened piping plovers, which have been preyed upon by red fox in Virginia. Other examples include, coyotes killing fawn and adult white-tailed deer which some people enjoy watching and legally hunt. Other people benefit from coyotes killing deer because it reduces damage to crops and the number of deer available for deer-vehicle collisions. Red fox eat eggs and fledglings of quail which some people enjoy viewing, calling, feeding, or legally hunting.

### 2.2.3 Effects on Dogs

A common concern among the public and wildlife professionals, including WS personnel, is the impact of damage management methods and activities on dogs. The ownership of dogs as pets and hunting companions has a long tradition in Virginia. However, not all dogs in Virginia have the same status. Since there are so many feral and unwanted dogs in Virginia, local government and humane societies must euthanize thousands of dogs annually (Table 2-1). Some dogs are feral, others are abandoned, and some such as wolf hybrids have been liberated. WS SOPs include measures intended to mitigate or reduce the effects on nontarget species populations and are presented in Chapter 3.

Table 2-1. Feral and unwanted dogs and hybrid dogs euthanized by local animal control and humane organizations in Virginia as reported by Division of Animal Industry Services of the Virginia Department of Agriculture and Consumer Services.

	Year			
	<u>1997<sup>2</sup></u>	<u>1998</u>	<u>1999</u>	<u>2000</u>
Dogs	38,057	68,258	67,300	70,667
Hybrid dogs <sup>1</sup>	24	32	14	19

1. Hybrid dogs are crosses between a wolf and a dog or a coyote and a dog.

2. Data is for last 6 months of 1997. This was first year reporting was required.

The public is concerned some dogs involved in killing or injuring livestock may be killed. More importantly, the public is concerned innocent dogs may be inadvertently killed by some damage management actions. Dogs used for legal hunting are believed by some people to be especially at risk. Special efforts are made to avoid harming dogs not involved in livestock depredation. Where dogs are killing or injuring livestock, lethal or nonlethal control methods may be implemented by livestock producers, local animal control officers, WS, and others to protect livestock.

#### Dogs Killing Livestock

Dogs occasionally kill or injure livestock (NASS 1992, 1995, 1996, 1999). However, dogs rarely feed upon the livestock they kill. Livestock producers and dog owners are very sensitive to the issue of dogs killing livestock because of the brutal means in which dogs kill or injure livestock, often many livestock animals are killed or injured in a single incident. Monetary losses incurred by livestock producers from dog damage can be substantial which makes livestock producers sensitive to dogs around livestock. Pet owners may have strong attachment to their dogs and may not objectively view their dogs as threats to livestock. Some pet owners have difficulty accepting responsibility for actions of their dogs, and the legal responsibility and liability dog owners bear for controlling their animals. All these issues make dogs and livestock a sensitive



issue.

### Analysis of Impacts on Hunting Dogs

An analysis of damage management methods (described in detail in Appendix B) identified M-44's and guard dogs as methods which could result in the unintentional death of a hunting dog. WS then conducted a risk analysis for hunting dogs that could be exposed to damage management methods that would result in unintentional death from M-44's (Table 2-2). This analysis considered hunting seasons when hunting dogs are likely afield (Table 2-3).

Guard dogs have been reported killing hunting dogs (deer) which resulted in intense conflicts between some deer-dog hunters and livestock producers. Guard dogs are a method WS may recommend, but the livestock producer is responsible for implementing.

Hunters are required by state law to have written or verbal permission to hunt on private land (VAC§18.2-132, VAC §18.2-134). Dogs for bear and deer hunting can be more than one mile from the hunter and chases can cross multiple properties. Dog hunters should have permission to hunt from private landowners where there dogs are likely to chase game animals. However, Virginia law (VAC§ 18.2-136 ) allows dog hunters using dogs to cross another person's land without permission to retrieve dogs. Based upon this analysis of the likelihood of hunting dogs to be in a fenced area and greater than one mile from the hunter, only dogs used for hunting bear and deer would likely be at risk. Based on this analysis, SOPs and state policies were developed (see SOP's in Chapter 3).

### Use of Dogs for Hunting

Hunting dogs are used in Virginia to pursue fox, raccoon, bobcat, opossum, rabbit, squirrel, doves, quail, grouse, turkey deer, bear, and waterfowl. There are an estimated 266,585 licensed hunters in Virginia who hunt with or without dogs (Wright et al. 2000). Hunting contributed \$1,404,269,000 in total economic output into the Virginia economy during 1991 (Southwick Associates 1994). The types of hunting with dogs are described.

#### Mounted foxhunting hounds

Mounted foxhunting has a long rich tradition in the Commonwealth of Virginia (Calos 1999, Juersivich 1999, Tolme 2000, Caggiano 2001). Virginia is the "capital" of foxhunting in the United States (Letter from D. Foster to M. Lowney, February 6, 2002). Mounted foxhunting occurs during the day. An average of 22 foxhounds may participate in a hunt and some hunters may use up to 50 foxhounds (Letter from G. Pitsenberger to M. Lowney, February 5, 2002). Hunts generally occur on a scheduled basis from September through March and certain farms are usually hunted once per month during these six months (Letter from G. Pitsenberger to M. Lowney, February 5, 2002; J. Fendley, Master of Foxhounds Association, pers. commun.). There are an estimated 5,000 - 6,000 mounted fox hunters in Virginia (VDGIF, unpub. data).

Most mounted foxhunting occurs in Loudoun, Fauquier, and Warren Counties (D.Foster, pers. comm.). Of these three counties, only Loudoun County has requested and received VCCDCP service on three farms in the 12 years of the VCCDCP. The nature of mounted foxhunting and mounted foxhunters is that written permission to hunt is lawfully obtained from the landowner and thus information of VCCDCP activities is usually passed on to the hunters. In twelve years of conducting the VCCDCP only one foxhound was captured. The accidental capture or take of foxhound is unlikely.

Only one foxhound has been captured by the VCCDCP in a snare. The dog was released unharmed by the

hunter (G. Pitsenberger, pers. commun.). Furthermore, the farmer informed the hunter of the whereabouts of the snares. Since this incident occurred, the landowner, the mounted foxhunter, and WS have worked together to prevent future risks to foxhounds.

The likelihood of VCCDCP interfering with mounted foxhunting is extremely low because most mounted foxhunts occurs in counties unserved by VCCDCP. It is possible that VCCDCP could become an inconvenience to mounted foxhunters at a very localized level. If mounted foxhunters choose to hunt an area in which VCCDCP activities are taking place they may arrange with the landowner and WS to mitigate for a particular hunt if reasonable notice is provided to WS and the landowner. To date, (FY2002), only two mounted foxhunters have requested mitigation with WS.

Mounted foxhunters believe their quarry is doing fine (74%) and feel there are more red fox today than 5 years ago (VDGIF, unpub. data). Ninety-three percent of mounted foxhunters believe that coyote abundance is up and 57% believe the coyote population is increasing (VDGIF, unpub. data).

#### General foxhunting hounds

Foxhunting is also practiced without the use of mounted hunters and occurs during the night or day. Eighty-three percent of these hunters conduct chases within a fenced foxhound training preserve (VDGIF, unpub. data.). However, sixty percent also participate in free cast hunts during the night and day on private lands (VDGIF, unpub. data). The home range of red fox is approximately 400 to 1200 acres (Samuel and Nelson 1982) and free cast fox hunts may cover this much area. These foxhunters generally hunt 60 times per year and run an average of 19 hounds per hunt (VDGIF, unpub. data). Of the 60 hunts per year over half (an average of 31) occur in fenced training preserves (VDGIF, unpub. data). Unlike bear and deer hunting with hounds, foxhounds stay closer to the hunter and therefore the seasoned fox hunter should have a good idea of where his/her hounds will travel during a hunt (VDGIF pers. comm.). Free cast foxhounds are possibly at risk to VCCDCP activities. Foxhounds run within fenced training preserves are not at risk to VCCDCP activities. The number of free cast fox hunters is unknown.

General foxhunters believe that fox populations are doing fine and that coyote populations are increasing (VDGIF, unpub. data). To date, only one general foxhunter has requested mitigation with WS in 12 years. WS will work with landowners and general foxhunters if requested by both parties to mitigate individual situations.

#### Raccoon hunting hounds

Raccoon hunting is especially popular in southwest Virginia but raccoon hunting occurs statewide. There are an estimated 10,000 raccoon hunters who hunt with hounds (Wright et al. 2000). Raccoon hunting seasons are long (Table 2-3). Some raccoon hunters use their hounds year round as allowed by state regulation as long as the quarry is fox in June and July (VDGIF pers. comm.). Some coonhounds become lost or abandoned which also increases their risk to VCCDCP activities. Unlike bear and deer hunting with hounds, coonhounds stay closer to the hunter and therefore the seasoned raccoon hunter should have a good idea of where his/her hounds will travel during a hunt (VDGIF pers. comm.). The likelihood of VCCDCP interfering with law abiding raccoon hunting is unlikely. WS will work with landowners and raccoon hunters if requested by both parties to mitigate individual situations. To date, only one raccoon hunter has requested mitigation.

The following is a breakdown of coonhounds captured by VCCDCP:

- 1 October 1993, one coonhound was snared and released unharmed. The hunter did not have permission to hunt on this property.

- 1.2 January 1995, two coonhounds were snared, both were shot by the farmer who had problems with these two dogs.
- 1.3 February 1998, one coonhound was snared and released unharmed.
- 1.4 May 1999, one coonhound was killed by an M-44. The hunter did not have permission to hunt on this property.
- 1.5 September 1999, one coonhound was killed by an M-44, lawfully hunting.

#### Bear and deer hunting hounds

Bears may be hunted with hounds from December through the first Saturday in January in Virginia. Family and community tradition plays a big part in bear hunting participation (N. Lafont, unpub. data). Bear hounds includes curs, plot, airdale, blue tick, walker, and red tick. Pack size may vary from 5 - 8 dogs. Bears are hunted with hounds using three methods. Hunters may be posted along suspected escape routes, by open cast or rig. Open cast is dogs are turned loose in the woods where bears are suspected of occurring and hunters chase the dogs. Rig hunting is starting from the road where bear sign is found by the hunters. The dogs are turned loose where the bear sign is detected and then the hunters follow the dogs. The chase may average 3 miles, but can be as long as 20 miles. Most bear chases are less than 6 miles. There were 17,157 bear hunters in 1999 and 45% hunted bear with dogs (VDGIF 2001). In Virginia most bear hunting occurs on public land on the Blue Ridge Mountains and west of the Blue Ridge Mountains. Hunters may cross private land to retrieve their dogs, but not shoot game animals. Bear populations have increased and broadened their distribution in Virginia in the last 50 years (VDGIF 2001). The bear population numbers approximately 4,000 - 5,000 animals (VDGIF 2001).

Deer may be hunted with hounds east of the Blue Ridge Mountains from late November until the first Saturday in January in Virginia. Deer hounds are broken down into two categories: long-legged and short-legged hounds. Long-legged hounds include walkers, black and tan, and red bone hounds. Short-legged hounds are mainly beagles. Hunters usually hunt with either long-legged or short-legged hounds and seldom mix them. Hunts with long-legged hounds may extend for miles. Hunts with short-legged hounds tend to be significantly shorter. Pack size may vary from 5 to 35 hounds during a hunt. Hunters are posted along suspected escape routes to shoot deer and catch dogs. Hunters are required to have verbal or written permission from the landowner. Hunters may cross private land to retrieve their dogs, but not shoot game animals. Deer occur and are hunted statewide in Virginia. The deer population is stable at approximately 1million animals.

Bear hounds and deer hounds, because of the length of the chase may separate themselves from hunters, are at risk to M-44s. Because of this, formal mitigation measures were taken to avoid M-44 risks to these hounds (see chapter 3). Deer hunting with hounds generally occurs east of the Blue Ridge further reducing any likelihood of VCCDCP interference. In 12 years of the VCCDCP only one bear hound was captured in a snare and released unharmed in 1992. In 12 years of the VCCDCP no deer hounds were captured. However, several deer hounds have been killed and injured by livestock guarding dogs (e.g. Anatolian shepard, Akbash, etc.) in eastern Virginia.

*The mitigation measure (no use of the M-44 from September 1 to January 7) was made to reduce the risk primarily to bear and deer hounds, but also to other hunting dogs. This is the most common time of year among all groups of hunters to be afield pursuing the various hunting opportunities that Virginia offers.*

#### Bobcat, squirrel, grouse, and turkey hunting dogs

Bobcats usually are hunted with hounds; squirrels with feists; grouse with pointers, setters, labs, and spaniels; and turkey with setters, pointers, and short-hairs. Pack sizes tend to be single dogs to three or four dogs. Hunting may occur on public or private land. Hunting generally occurs in wooded/forest habitat and therefore the likelihood of any risk from VCCDCP methods to these types of hunting dogs is unlikely (Table 2-2). In 12

years of the VCCDCP, no hunting dog of the above forms of hunting has been captured or killed. Hunters are required to have verbal or written permission from the private landowner.

#### Opossum, rabbit, dove, quail/pheasant, and waterfowl dogs

Little information exists on opossum hunting in Virginia. Opossum are hunted with hounds; rabbits with beagles, doves, quail and pheasants with labs, pointers, setters and retrievers; and ducks with labs, Chesapeake, and retrievers. Pack sizes tend to be single animals to two or three. The VCCDCP has never captured a dog being used in these hunting activities.

Opossum will likely be hunted on a specific property. Chases tend to be short. The VCCDCP has never captured a hound engaged in opossum hunting. Hunters are required to have verbal or written permission from the private landowner.

Rabbit hunting would likely take place on a specific property. Rabbits do not venture far when chased and the average length of chase may be less than 10 square acres. Rabbit hunting generally occurs with use of one to six beagle hounds and several hunters may participate. Rabbit hunting is usually conducted in thick brushy habitat, (i.e., recently clear cut forests, heavily vegetated fence rows) or early successional forest. The VCCDCP has never captured a beagle hound engaged in rabbit hunting. Hunters are required to have verbal or written permission from the private landowner.

Dove, quail, and pheasant hunting would likely occur on a specific property. Bird dogs are almost always in control of the hunter. The VCCDCP has never captured a bird dog. Hunters are required to have verbal or written permission from the private landowner.

Waterfowl dogs engaged in waterfowl hunting are unlikely to encounter M-44s which are set in fenced pastures. The VCCDCP has never captured a waterfowl dog. Hunters are required to have verbal or written permission from the private landowner.

M-44s pose the most yet unlikely risk to hunting dogs and the mitigation measure to stop using the M-44 from September 1 to January 7 further reduces risks. The likelihood of VCCDCP interfering with law abiding opossum, rabbit, quail/pheasant, dove, and waterfowl hunting is unlikely. WS will work with landowners and the above mentioned hunters if requested by both parties to mitigate individual situations.

Based on the above information, the impact the VCCDCP on the economics and opportunity of hunting with dogs is negligible:

1. The VCCDCP is very small in scale (working an average of 140 properties total each year spread throughout 30 or more counties, e.g. an average of <5 properties/county).
2. The total number of farms served are not serviced all year long or all at any one time.
3. If there is any risk to hunting dogs it occurs outside of most hunting seasons.
4. The VCCDCP will work with hunters and landowners alike to reduce risks on an individual basis.
5. The occurrence of hunting dogs being captured or killed has been low and will continue to be low.
6. The VCCDCP is 12 years old and Virginia hunting opportunity for many game species is at record levels.
7. Houndsmen numbers are down compared to 20 years ago (29,119 coon hunters in 1983; 9,631 coon-hunters in 1999).
8. Fox populations are at or near carrying capacity (VDGIF).

#### Analysis of Impacts on Pet, Companion, or Work Dogs

Pet or companion dogs are required by county ordinance granted by state law to be under the control of the owner (VAC§3.1-796.93) and cared for by the owner (VAC§3.1-796.68). The VCCDCP mitigates with landowners requesting VCCDCP assistance by requesting landowners notify their neighbors and inform them of the risks associated with livestock protection activities. Regardless of this information, some people fail to restrain pet or companion dogs thereby putting their dogs at risk to VCCDCP activities and other risks (i.e., vehicle accidents). Some pet or companion dogs also become lost and fall victim to nature (Wasson 1998). Some companion animals may be abandoned, picked up and euthanized by local humane societies (Table 2-1).

Work dogs (herding and guard dogs) are especially at risk on farms where VCCDCP activities are taking place. Therefore, arrangements between WS and the landowners are taken to reduce any likelihood of any accidents.

#### Analysis of Impacts on Feral, Abandoned, or Liberated Wolf Hybrid Dogs

Feral, abandoned, and liberated dogs or wolf hybrids were excluded from analysis of impacts because they are ownerless, living in a semi-wild or wild state, and without the care of an owner (VAC§3.1-796.68). Furthermore, some of these dogs are killing livestock and the VCCDCP is requested by the livestock producer and local animal control officers to capture these dogs.

Table 2-2. Analysis of vulnerability of types of hunting dogs to M-44's. WS analyzed the likelihood of a hunting dog being in an extended chase and in a fenced area where M-44's would be set.

Wild animal hunted with dogs	Likelihood of dog in fenced area with M-44	Distance of dog from hunter	
		> 1/4 mile distance	> 1 mile distance
bear	possible	likely	likely
bobcat	unlikely	likely	likely
deer	possible	likely	likely
fox	possible	likely	unlikely
opossum	unlikely	unlikely	unlikely
rabbit	likely	unlikely	unlikely
raccoon	unlikely	unlikely	unlikely
squirrel	unlikely	unlikely	unlikely
doves	likely	unlikely	unlikely
quail/pheasant	likely	unlikely	unlikely
grouse	unlikely	unlikely	unlikely
turkey	unlikely	unlikely	unlikely
waterfowl	unlikely	unlikely	unlikely

Table 2-3. Hunting and chase seasons that dogs can be used in Virginia. There are some additional hunting seasons where the use of dogs are prohibited. The Virginia Department of Game and Inland Fisheries should be consulted for detailed information on all hunting seasons. Hunting seasons are shaded in gray and chase seasons (no killing of game animal) are shaded in checkerboard. Hunting and chase seasons are for 2000 - 2001 seasons.

<u>Month of year</u>												
<u>Animal</u>	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
bear												
bobcat												
deer <sup>1</sup>												
fox												
opossum												
raccoon												
rabbit												
squirrel												
doves												
quail/ pheasant												
grouse												
turkey												
waterfowl												

1. Hunting of deer with dogs is allowed east of the Blue Ridge Mountains only, with some exceptions.

## 2.2.4 Effects on Human Health and Safety

### 2.2.4.1 Safety and efficacy of chemical damage management methods.

Members of the public have expressed concerns that chemical damage management methods should not be used because of potential adverse effects from direct exposure to chemical toxicants or from animals

that have died as a result of toxicants. Under the alternatives proposed in this EA, the primary toxicants proposed for use by WS are sodium cyanide (M-44) and sodium fluoroacetate (LPC). A less commonly used toxicant proposed for use by WS is sodium nitrate and charcoal (Gas Cartridge). Sodium cyanide, sodium fluoroacetate, and sodium nitrate/charcoal use is regulated by the EPA through FIFRA, by VDACS, OPM through the Virginia Pesticide Control Act, and by WS Directives. There are no repellents registered for use to protect livestock from predator attacks.

The use of sodium cyanide, sodium fluoroacetate, and sodium nitrate/charcoal for mammalian predator damage management poses negligible risk when used according to directives, policies, laws, and label directions (USDA 1997 revised, Appendix P). According to the EPA, Poison Control Center, Toxic Exposure Surveillance System for 1993 - 1996, there were over 400,000 recorded human exposures to all sorts of animal toxicants, however, there were no recorded M-44 public human exposures (email from J. Shivik, NWRC to M. Lowney, February 17, 1999). M-44's and coyote getters have been used for more than 50 years by WS without any employee fatalities. There was one human fatality from the predicated use of sodium cyanide by a non-WS employee using a coyote getter (Letter from D. Gretz to ADC State Directors, Western Region, November 27, 1989). WS SOPs include measures intended to mitigate or reduce the effects on human health and safety and are presented in Chapter 3. WS personnel who apply pesticides are certified restricted-use pesticide applicators and apply pesticides according to label instructions. Certification is obtained after passing written tests administered by the VDACS, Office of Pesticide Management.

#### **2.2.4.2 Impacts on human safety of nonchemical VCCDCP methods**

Some people may be concerned that WS use of firearms and traps could cause injuries to people. WS personnel occasionally use rifles and shotguns to remove coyotes, dogs, or red fox that are preying upon or attempting to prey upon livestock. Handguns may be used to euthanize trapped or snared animals. WS personnel use special restraining traps and snares to humanely capture coyotes, dogs, or red fox. WS SOPs include measures intended to mitigate or reduce the effects on human health and safety and are presented in Chapter 3.

Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 3 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are also required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

The use of restraining traps such as leghold traps or snares is a sensitive issue because of the lack of understanding and experience by the public in using these devices. Some people believe they could be captured and restrained by these traps or injured. Some people believe these traps indiscriminately and automatically capture people who may unknowingly approach locations where these traps or snares are set. WS personnel meet with livestock producers and neighbors to explain and demonstrate the use of traps and snares to alleviate anxiety some people may have. WS SOPs include measures intended to mitigate or reduce the effects on human health and safety and are presented in Chapter 3.

#### **2.2.4.3 Impacts on human safety of not conducting VCCDCP to reduce a threat or safety risk from coyotes which attack children and adults**

The concern stated here is that the absence of adequate VCCDCP would result in adverse effects on

human safety, because in the event of a coyote attack on humans, WS or the Commonwealth of Virginia would not have effective methods and expertise available to capture the offending coyote. Effective methods which would be unavailable are M-44's and specialized leghold traps and snares for capturing coyotes. Also, there would be a lack of knowledge and experience on how to efficiently capture a threatening coyote. Although WS receives few requests to conduct VCCDCP for threats to human safety, the potential impacts of not conducting such livestock protection work would lead to less efficient methods and expertise being used to remove threatening coyotes. In Virginia, WS has removed one coyote that posed an immediate threat to human safety, and the likelihood of further WS activities to protect human safety exists. In Fiscal Year 2000, there have been 6 reported incidents of coyotes confronting people (MIS 2000). Protecting human safety is not within the scope of this EA, however, WS may provide service to protect human safety under other NEPA documents or emergencies.

## **2.2.5 Impacts to Stakeholders, including Aesthetics**

### **2.2.5.1 Effects on Human Affectionate-Bonds with Individual Animals and on Aesthetic Values of Wild Canid Species**

Some individuals or groups of wild canids habituate and learn to live in close proximity to humans. Some people in these situations feed such animals and/or otherwise develop emotional bonds toward such animals that result in aesthetic enjoyment. In addition, some people consider individual wild animals as "pets," or exhibit affection toward these animals. Examples would be, fox that live near and become accustomed to people and eventually the fox begins taking food scraps from the public. Many people do not develop emotional bonds with individual wild animals, but experience aesthetic enjoyment from observing them.

Public reaction to damage management is variable because members of the public can have different attitudes toward wildlife and wildlife damage. Some individuals that are negatively affected by wildlife support removal or relocation of damaging wildlife. Other individuals affected by the same wildlife may oppose removal or relocation. Individuals unaffected by wildlife damage may be supportive, neutral, or opposed to wildlife removal depending on their personal views and attitudes. Some people do not believe that individual coyotes or fox should even be excluded by fencing to stop or reduce damage problems. Some of them are concerned that their ability to view coyotes, foxes, and other wildlife species are lessened by non-lethal fencing and habitat alteration efforts.

The public's ability to view wild canids in a particular area would be more limited if the coyotes or red fox are removed. In addition, red fox and coyotes are usually difficult to observe because of the secretive and nocturnal behavior. These animals can live in close proximity to humans and go undetected. Additionally, the opportunity to observe coyotes and fox increases as dispersal in the fall and late winter could possibly replace the animals removed during a damage management action. The opportunity to view or hear wild canids would be available if an individual makes the effort to visit other parks or areas with adequate habitat and local populations of the species of interest.

### **2.2.5.2 Effects on Aesthetic Values of Coyotes**

Livestock producers who have sheep, goats, or cattle killed by coyotes believe coyotes have little to no positive value. Some hunters believe coyotes compete with them for the same game animals they hunt. Some landowners who benefit from leasing land to hunters may believe coyotes and red fox are depriving them of monetary gain because coyotes and fox are eating game animals that hunters would be willing to lease land to hunt. These individuals may believe the environment would be better off if no coyotes and fewer red fox existed in Virginia. In these instances, coyotes and red fox have low or no aesthetic value to



these stakeholders.

## **2.3 ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE**

### **2.3.1 Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area.**

Some individuals might question whether preparing an EA for an area as large as Virginia would meet the NEPA requirements for site specificity. Wildlife damage management falls within the category of federal or other agency actions in which the exact timing or location of individual activities cannot usually be predicted well enough in advance to accurately describe such locations or times in an EA or EIS. The WS program is analogous to other agencies or entities with damage management missions such as fire and police departments, emergency clean-up organizations, etc. Although WS can predict some of the possible locations or *types* of situations and sites where some kinds of wildlife damage will occur, the program cannot predict the specific locations or times when affected resource owners will determine a damage problem has become intolerable to the point that they request assistance from WS. Nor would WS be able to prevent such damage in all areas where it might occur without resorting to destruction of wild animal populations over broad areas at a much more intensive level than would be desired by most people, including WS and state agencies. Such broad scale population control would also be impractical, if not impossible, to achieve.

If a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire state may provide a better analysis than multiple EAs covering smaller zones.

### **2.3.2 Cost Effectiveness of Coyote Damage Management**

NEPA does not require preparation of a specific cost-benefit analysis, and consideration of this issue would not be essential to making a reasoned choice among the Alternatives being considered. However, cost-effectiveness of WS activities has been a concern among some members of the public. A specific cost-benefit analysis of a major component of WS activities was prepared.

A cost-benefit analysis of WS' activities as conducted during the decades of widespread toxicant use in the western United States would likely show a much higher benefit per unit cost than predator damage management programs as currently practiced in Virginia. Although certain toxicants were cheaper and very effective at keeping predator numbers and predator losses low, there were valid concerns about some environmental impacts. Our social value system has essentially established limits on how cost-effectively predator damage management can be conducted. As restrictions on use of damage management methods increase, cost-effectiveness of damage management is reduced.

Connolly(1981) examined the issue of cost effectiveness of federal predator damage management programs and concluded that public policy decisions have been made to steer the program away from being as cost effective as possible. This is because of the elimination of damage management methods believed to be effective but less preferable, such a toxic baits. In addition, the increased costs of implementing the remaining available methods were to achieve other public benefits besides livestock protection and could be viewed as mitigation for the loss of effectiveness in reducing damage. USDA (1997revised) stated that "Cost effectiveness is not, nor should it be, the primary goal of the WS program." Additional constraints, such as environmental protection, land management goals, and others, are considered whenever a request for assistance is received (USDA 1997). These constraints increase the cost of the program while not necessarily increasing its effectiveness, yet they are considered a vital part of the WS program.

This cost-benefit analysis is limited to quantifiable values and does not consider a number of values that would

be difficult to measure. When sheep are repeatedly harassed by predators, for example, they become extremely *spooky* and do not disperse and feed normally. Therefore, they would not find the quality and quantity of feed that they would have if unstressed, resulting in lower lamb weights at the end of the grazing season. This is a form of predator damage, but it would be difficult to quantify. Jahnke et al. (1987) and Wagner (1988) discussed additional examples of indirect predator damage, including increased labor costs and producer efforts to find sheep scattered by predators and range damage related to the tighter herding required in response to the presence of predators.

Cost-effectiveness of WS predator damage management can be assessed by looking at the difference between: 1) the value of actual losses with the program in place, plus the cost of the program, and 2) the value of what losses could reasonably be expected without the program in place. This cost-benefit analysis is limited specifically to WS efforts to protect sheep in the analysis area during FY 98 for two primary reasons. A critical part of the determination of cost-benefit is the estimation of what losses might reasonably be expected to be without a damage management program and 2) sheep are the only class of livestock for which studies have been specifically conducted to look at this issue.

USDA (1997revised) cites four studies where sheep losses to predators were documented with no damage management program in place

(Table 2-4). Annual predation loss rates during these studies varied from 6.3-29.3% for lambs and 0 to 20.8% for adult sheep. The unweighted average rate of loss to predators was about 7% for sheep and 17% for lambs. It is reasonable to assume losses without damage management in place could be about 16% for adult sheep and 24% for lambs in areas with historic coyote predation. However, for purposes of this analysis, we will conservatively assume that loss rates for sheep and lambs could be expected to be 7% and 17%, respectively, in the absence of a damage management program.

Table 2-4 Summary of field studies of sheep losses without coyote control annual losses (%)

Source	Location	Year	Sheep	Lambs
Henne (1977)	Montana	1974/1975	20.8%	29.3%
Munoz (1977)	Montana	1975/1976	16%	24.4%
McAdoo and Klebenow (1978)	California	1976	Losses were not reported.	6.3%
Delorenzo and Howard (1976)	New Mexico	1976	0%	15.6%
Delorenzo and Howard (1976)	New Mexico	1975	0%	12.1%

WS used 1998 information for its economic analysis because

this was the year with the most recent loss and funding data. Data provided by the NASS (1999) and VASS (1998) suggests that actual coyote losses on farms serviced by VCCDCP in 1998 were 108 adult sheep and 550 lambs, valued at an average price of \$97 each. Table 2-5 shows that based on expected predation loss rates in the absence of a damage management program, the projected losses for sheep producers in Virginia during 1998 may have been valued at more than \$1.1 million. VCCDCP expenditures for predator damage management to protect sheep in the analysis area in FY 98 was \$92,000. This figure includes salaries and benefits for field, supervisory, and administrative staff, vehicle expenses, supplies and equipment, and

overhead for all activities to protect sheep in the analysis area during FY 98. The difference between 1) the value of actual 1998 losses, plus the cost of the damage management program, and 2) the value of what losses could reasonably be expected to be without a damage management program is conservatively estimated at \$952,884. This amount, divided by the cost of the FY 98 program, yielded a positive benefit-cost ratio of 10.35 to 1 or for every dollar spent on VCCDCP there was potentially up to \$10.35 saved.

Table 2-5 Actual and hypothetical sheep and lamb losses to predators in the Virginia analysis area for FY 1998. Actual losses taken from National Agricultural Statistics Service (1998) data. The Virginia Cooperative Coyote Damage Control Program budget in 1998 was \$92,000.

	<b>Actual losses w/ VCCDCP (% predation)</b>	<b>Projected losses w/out VCCDCP (% predation)</b>	<b>Difference</b>	<b>Avg. 1998 \$ Value/Head</b>	<b>Total Saved</b>
Sheep (37,000)	108 (0.29 )	2,590 ( 7 )	2,482	\$97	\$240,754
Lambs (52,000)	550 (1.05)	8,840 ( 17 )	8,290		\$804,130
<b>Total</b>	<b>658</b>	<b>11,430</b>	<b>10,772</b>		<b>\$1,044,884</b>

If projected losses to cattle and goats were included in this analysis, losses to the Virginia livestock industry would be much greater than our conservatively estimated \$952,884 dollars. Also, if these losses were included in a cost:benefit analysis, then the benefit would exceed 10.35 to 1.

### **2.3.3 Effects on legal hunting and trapping**

Some people may be concerned that WS-conducted coyote and red fox removal activities would affect regulated hunting and trapping by reducing local wild canid populations and coyote and red fox lethal and nonlethal damage management methods interfere with legal regulated hunting and trapping.

#### **2.3.3.1 Impacts on coyote, fox, and raccoon hunters and trappers**

WS annual take of coyotes, fox, and raccoons by lethal damage management methods is very minimal (Table 2-6) compared to the annual take by licensed hunters within Virginia. WS activities would result in reduced coyote, fox, or raccoon densities on project area properties and possibly on adjacent properties, hence slightly reducing the number of coyotes, foxes, and raccoons that may otherwise be available to local licensed hunters. Coyote, fox, and raccoon densities on other properties outside the project area

would likely not be affected, thus providing ample opportunities for hunters and trappers to harvest these animals.

### **2.3.3.2 Impacts on rabbit, deer, turkey, and other hunters**

Rabbit, turkey, and deer hunters may believe programs to reduce coyote and fox predation on livestock benefits them because competition with these predators for the same game animals is reduced. Many of these hunters believe there would be more game animals to hunt near livestock farms where WS is removing coyotes and red fox. Some deer hunters east of the Blue Ridge Mountains and some rabbit hunters may be concerned that some nonlethal or lethal damage management methods may harm or capture their hunting dogs.

Coyotes kill and eat fawn deer and adult deer. Coyotes are capable of killing adult deer, especially in winter and the spring (Messier et. al. 1986 in Parker 1995, Lavigne 1996). Coyotes appear most successful in attacking and killing deer when deer leave the woods and enter fields or pastures where coyotes overtake the deer who have less stamina. The white-tailed deer may provide up to 60% of a coyotes diet from January through April and up to 70% in June and July when fawns are especially susceptible (Witmer et. al. 1995, Lavigne 1992, Blanton and Hill 1989). Another study showed that the diet of eastern coyotes is comprised of up to 90% deer during certain times of the year (Ozoga and Harger 1966). Coyotes focus on hunting for deer fawns during fawning in early June (Blanton and Hill 1989). The impact of coyote predation on deer populations in the eastern United States needs further research and understanding.

WS activities would result in reduced coyote, feral dog, and red fox densities on project area properties and possibly on adjacent properties, hence slightly increasing the availability of rabbits, deer, turkey and other game animals available to local licensed hunters that could otherwise become prey to these predators.

### **2.3.3.3 Loss of hunting opportunity because of the VCCDCP**

At the individual property level, it is possible that certain property owners may discontinue hunting opportunity for short periods of time until such arrangements can be made to mitigate for a hunt. Such occurrences would be uncommon. Concerns over lost hunting opportunities because of VCCDCP at a statewide, regional, or local level are unsubstantiated. There is no evidence to suggest that hunters have stopped hunting because of the VCCDCP thereby reducing opportunity or the economic value of hunting. Other factors such as loss of rural values and commercial development of the countryside are what most hunters believe impacts their sport the most (VDGIF, unpublished data).

Many livestock producers are more concerned about protecting their flock than they are about allowing hunting. Hunters need to understand the livestock producers standpoint and communicate with these landowners to prevent a loss of hunting opportunity. The VCCDCP conducts little predation management activities during the hunting season because livestock predation is at a seasonal low. At the local level each county has tens of thousands of acres of private and possibly government owned lands for hunters to use if a particular property is being worked by the VCCDCP.

Many deer, turkey, fox, rabbit, and raccoon hunters alike may possibly benefit from a local temporary reduction in the coyote population. The temporary reduction in coyote numbers on a local property may leave more game animals for hunters. Many hunters recognize this and support the VCCDCP for these reasons.

Table 2-6. Number of selected animals taken by the Wildlife Services program of the United States Department of Agriculture, Animal and Plant Health Inspection Service, in Virginia to reduce or eliminate damage to resources in federal fiscal year 1999 (October 1, 1998 through September 30, 1999).

	<u>Animals killed by Wildlife Services</u>	<u>Animals killed by legal hunters in 1998 - 1999 season</u> <sup>1</sup>
coyotes	284	6,277
red fox	114	17,315
gray fox	35	28,461
raccoon	63	96,421
bobcat	6	4,004
opossum	37	n/a
skunk	9	n/a

1. Information provided by Virginia Department of Game and Inland Fisheries.

#### **2.3.4 Corrective Predator Damage Management Only, No Preventative Damage Management**

Some people believe lethal management should be implemented to stop predation by coyotes and red fox on livestock only after predation has started. These people oppose preventative lethal management which would kill coyotes living near livestock operations even though these same livestock operations have chronic historic predation. While WS is unable to predict which coyote or red fox will kill livestock or which livestock operations will have substantial predator losses, WS can look at historical records for each farm and draw inferences. On livestock operations with historic predator losses, it is likely there will be future losses. Therefore, it is prudent for the livestock manager to have coyotes removed as good husbandry, especially prior to lambing, kidding, or calving (Conner et. al. 1998). Furthermore, Wagner and Conover (1999) found that preventative damage management in areas of historic predation on livestock significantly reduced predation to livestock and was cost effective. WS is able to better serve the livestock industry when requests for assistance for corrective predator damage management are more evenly distributed from late winter through fall rather than the VCCDCP being overwhelmed with requests for service during spring lambing, kidding, and calving.

#### **2.3.5 Require livestock producers to help themselves before receiving assistance from WS**

Although no law or policy requires livestock producers to employ husbandry or other predation prevention practices to protect their livestock, 65% of Virginia cattle and 87% of sheep producers report using nonlethal methods to reduce predation (NASS 1999). Furthermore, the U. S. District Court of Utah (1993) found the imminent threat of damage or loss of resources is often deemed sufficient for wildlife damage management actions to be initiated. On average, sheep producers in Virginia spent \$1,115 per year/farm on nonlethal management methods (NASS 1999) and \$0.06 per breeding sheep annually (NASS 1995) or \$3.42 per farm annually on lethal damage management methods (NASS 1998).

Livestock producers in Virginia employ many lethal and nonlethal management methods to reduce predator losses. In 1999, 105 livestock producers reported the use of 16 different nonlethal methods (VA WS unpub. data). Therefore, requests for WS assistance to protect livestock from predation in Virginia in 1999 came from producers who were already using an average of 3.3 nonlethal methods on each operation, but still

experienced unacceptable predation. The most frequently used nonlethal methods were: 1) fencing barriers (conventional) 2) husbandry 3) fencing barriers (permanent electrical) and 4), guarding dogs (VA WS unpub. data). WS policy is to respond to all requests for assistance within program authority, responsibility, and budget. If improved husbandry or other nonlethal methods would reduce predation on livestock, then WS will recommend these practices.

### **2.3.6 Use nonlethal before implementing lethal methods**

Some people want nonlethal methods used before offending coyotes and red fox are killed. NASS (1999) reported 87% of Virginia sheep producers and 65% of cattle producers used nonlethal methods, yet many of them still had predation problems. The purpose of the VCCDCP is to reduce predation and protect livestock. If producers are already using nonlethal methods, and nonlethal methods are best implemented by producers, then it is illogical for WS to implement nonlethal methods or withhold lethal management to stop predation on livestock.

### **2.3.7 No use of chemical methods**

Much of the public's concern over the use of registered toxicants for predator damage management is based on an erroneous perception that WS uses non-selective, outdated chemical methodologies. In reality, the chemical methods currently used by WS have a high degree of selectivity (see section 4.1.2). WS' use of registered toxicants is regulated by the EPA through the FIFRA, by MOU's with other agencies, and by program directives. In addition, APHIS conducted a thorough risk assessment that concluded chemicals used according to label directions are selective for target individuals or populations, and therefore have no negligible impacts on the environment (USDA 1997 revised, Appendix P).

The decision to use registered toxicants falls within the WS decision model (see section 3.2.3 Slate et al. 1992). Chemical methods are used because they allow for efficient and effective delivery of service to livestock producers that may not be served if registered toxicants were unavailable. Registered toxicants, such as the M-44, have the ability to work during inclement weather and solve predation problems, whereas traps and snares may be inoperable and shooting impractical in the same inclement weather.

### **2.3.8 Humaneness and animal welfare concerns of methods used**

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if *"... the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process."*

Suffering is described as a *"... highly unpleasant emotional response usually associated with pain and distress."* However, suffering *"... can occur without pain ...,"* and *"... pain can occur without suffering ..."* (Andrews et al. 1993). Because suffering carries with it the implication of a time frame, a case could be made for *"... little or no suffering where death comes immediately ..."* (CDFG 1991), such as shooting.

Defining pain as a component in humaneness of WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would *"... probably be causes for pain in other animals ..."* (Andrews et al. 1993). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (CDFG 1991).

Pain and suffering, as it relates to WS damage management methods, has both a professional and lay point of

arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since "... *neither medical or veterinary curricula explicitly address suffering or its relief*" (CDFG 1991).

Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology and funding.

WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some VCCDCP methods are used in situations where nonlethal damage management methods are not practical or effective.

WS is very concerned about animal welfare. As such, where possible more humane methods are used to capture or kill animals. WS has been funding research to develop Best Management Practices for the use of restraining traps since 1997 and funding trap research for decades (Phillips and Mullis 1996, Engeman et. al. 1997). Traps and snares used by WS embrace many innovations reported in the scientific literature (Phillips and Gruver 1996, Gruver et. al. 1996, Phillips 1996, Phillips et. al. 1990). WS Directive 2.450 requires coyote size traps equivalent to size 3N Victor or larger must have smooth rounded offset jaws or padded jaws, and pan-tension devices, unless pan tension devices preclude capture of the intended target species.

There is concern about captured animals remaining in traps and either chewing their feet or dying. This perception, held by some of the public is not supported by fact. Recent research showed coyotes rarely chew their feet (< 1% of captures) and no animals die in coyote traps from the trap ((Best Management Practices (BMP) workshop, unpubl. data, 2000)).

VA WS personnel are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology, workforce and funding. Mitigation measures/SOPs used to maximize humaneness are listed in Chapter 3.

### **2.3.9 Lethal Methods May Actually Increase Predation and the Coyote Population through Compensatory Reproduction**

Mortality in coyote populations can range from 19%-100%, with 40%-60% mortality most common (USDI 1979). Several studies of coyote survival rates, which include calculations based on the age distribution of coyote populations, show typical annual survival rates of only 45% to 65% for adult coyotes. High mortality rates have also been shown in four telemetry studies involving 437 coyotes that were older than 5 months of age; 47% of the marked animals were known to have died. Mortality rates of "unexploited" coyote populations were reported to be between 38%-56% (USDI 1979). Thus, most natural coyote populations are not stable (USDI 1979). In studies where reported coyote mortality was investigated, only 14 of 326 recorded mortalities were due to WS' activities (USDI 1979).

Dispersal of "surplus" young coyotes is the main factor that keeps coyote populations distributed throughout their habitat. Such dispersal of subdominant animals removes surplus animals from higher density areas and repopulates areas where artificial reductions have occurred. Three studies (Connolly et al. 1976, Gese and Grothe 1995, Gese 1999) investigated the predatory behavior of coyotes and determined that the more dominant (alpha) animals (adult breeding pairs) were the ones that initiated and killed most of the prey items. Thus, it appears the above concern is unfounded because the removal of local territorial (dominant, breeding adult) coyotes actually removes the

individuals that are most likely to kill livestock and generally results in the immigration of subdominant coyotes that are less likely to prey on livestock.

Coyotes in areas of lower population densities may reproduce at an earlier age and have more offspring per litter, however, these same populations generally sustain higher mortality rates. Therefore, the overall population of the area does not change. The number of breeding coyotes does not substantially increase without exploitation and individual coyote territories produce one litter per year independent of the population being exploited or unexploited. Connolly and Longhurst (1975) demonstrated that coyote populations in exploited and unexploited populations do not increase at significantly different rates and that an area will only support a population to its carrying capacity.

#### **2.3.10 A site specific analysis should be made for every location where livestock predation management could occur**

The underlying intent for preparing an EA is to determine if a proposed action might have a significant impact. The WS EA process is issue driven, meaning issues that were raised during the interdisciplinary process and through public involvement that were substantive, were used to drive the analysis and determine the significance of the environmental impacts of the proposed action and the alternatives. Therefore, the level of site specificity must be appropriate to the issues listed. The substantive issues analyzed were effects on coyote and fox populations, effects on nontarget wildlife populations including T&E species, effects on dogs, effects on human health, and impacts on stakeholders including aesthetics.

The analysis in this EA was driven by the issues raised during the NEPA process. More detailed site specific information would not contribute to the public's understanding of the proposed action, nor would it change the analysis and result in substantially differing environmental consequences. Also, further site-specific analysis would provide no additional useful information to the decision-maker (Eccleston 1995).

In addition to the analysis contained in this EA, WS personnel use the WS Decision Model (Slate et al. 1992) as a site specific tool to develop the most appropriate strategy at each location. The WS Decision Model is an analytical thought process used by WS personnel for evaluating and responding to wildlife damage management requests (Fig. 3-1).

#### **2.3.11 Relocation of coyotes killing livestock**

Virginia law (VAC§ 29.1-542) prohibits release of coyotes in Virginia. Translocation of wildlife is also discouraged by WS policy (WS Directive 2.501) because of stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats (Nielsen 1988).



## CHAPTER 3: ALTERNATIVES INCLUDING THE PROPOSED ACTION

### 3.0 INTRODUCTION

This chapter consists of five parts: 1) an introduction, 2) description of the alternatives, 3) VCCDCP strategies and methodologies available to WS in Virginia, 4) alternatives considered but not in detail, with rationale, and 5) mitigation and SOPs for coyote, fox, and dog damage management. Five alternatives were identified, developed, and analyzed in detail by a multi-agency team (WS, VDACS, VDGIF) and two alternatives were considered but not analyzed in detail.

Alternatives analyzed in detail are:

- 1) Alternative 1 - Continue the Current Federal VCCDCP Program. (Proposed Action/No action)
- 2) Alternative 2 - Nonlethal VCCDCP Only By WS
- 3) Alternative 3 - Technical Assistance Only.
- 4) Alternative 4 - Lethal VCCDCP Only By WS
- 5) Alternative 5 - No Federal role in VCCDCP.

### 3.1 DESCRIPTION OF THE ALTERNATIVES

#### 3.1.1 Alternative 1 - Continue the Current Federal VCCDCP Program /Integrated Wildlife Damage Management (No Action/Proposed Action).

The No Action alternative is a procedural NEPA requirement (40 CFR 1502), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternatives. The No Action alternative, as defined here, is consistent with the Council on Environmental Quality's (CEQ's) definition (CEQ 1981).

The proposed action is to continue the current WS program in Virginia that responds to requests for VCCDCP to protect livestock from coyote, dog, and fox predation. An IWDM approach would be implemented which would allow use of any legal technique or method, used singly or in combination, to meet requestor needs for resolving conflicts with coyotes, dog, or red fox (Appendix B). Cooperators requesting assistance would be provided with information regarding the use of effective nonlethal and lethal techniques. Lethal methods used by WS would include shooting, calling and shooting, trapping, snaring, dogs, Gas Cartridges, M-44's, and LPCs. Nonlethal methods used by WS may include strobe sirens and placing guard dogs. In many situations, the implementation of nonlethal methods such as guard dogs, llamas, or donkeys, fencing, moving livestock to other pastures, shed lambing, night penning, habitat alteration, herding, and scare devices are best implemented by livestock producers and they would be the responsibility of the requestor to implement. VCCDCP by WS would be allowed in the State, when requested, on private or public lands (e.g., state) where a need has been documented and upon completion of an *Agreement for Control*. All management actions would comply with appropriate federal, state, and local laws.

#### **3.1.1.1 Disposition of coyotes, dogs, and foxes**

Coyotes and foxes captured in leg-hold traps and snares will be euthanized by gunshot<sup>2</sup>. There are different outcomes for dogs captured in leg-hold traps or snares depending on the situation:

- Dogs will be returned to the owner with the assistance of local animal control if the dog is wearing identification and is known not to be the offending predator.
- Dogs found abandoned or not properly cared for may be euthanized if the dog wears no identification. Abandoned and not properly cared for dogs will be turned over to local animal control if the dog wears identification (Virginia Comprehensive Animal Law §§3.1-796.114)
- Dogs known to be livestock killers wearing identification or not may be euthanized if the dog is caught in the act of killing, injuring, or chasing livestock. In addition, local animal control will be contacted to handle these dogs that wear identification in events when such dogs are properly restrained (Virginia Comprehensive Animal Law §§3.1-796.116).

#### **3.1.2 Alternative 2 - Nonlethal VCCDCP Only By WS.**

Under this alternative, only nonlethal direct damage management activities and technical assistance would be provided by WS to resolve coyote, dog, or red fox predation on livestock. Persons receiving nonlethal technical assistance could still resort to lethal methods that were available to them. Lethal control methods which could legally be implemented by the public are shooting, calling and shooting, trapping, snaring, dogs, and Gas Cartridges. M-44's and LPCs are only legally available for use by WS employees. Appendix B describes a number of nonlethal methods available for use by WS under this alternative.

#### **3.1.3 Alternative 3 - Technical Assistance Only.**

This alternative would not allow for WS operational VCCDCP in Virginia. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, state or local government agency personnel, or others could conduct VCCDCP using traps, shooting, calling and shooting, snares, Gas Cartridges, or any nonlethal method that is legal. Currently, M-44's and LPCs are only legally available for use by WS employees. Appendix B describes a number of methods that could be employed by private individuals or other agencies.

#### **3.1.4 Alternative 4 - Lethal VCCDCP Only By WS.**

Under this alternative, only lethal direct damage management services and technical assistance would be provided by WS. Technical assistance would include making recommendations to livestock producers to allow them to take coyotes, dogs, and red fox by lethal methods. Requests for information regarding nonlethal management approaches would be referred to VDGIF, VDACS, local animal control agencies, or private businesses or organizations. Individuals or agencies might choose to implement WS lethal recommendations, implement nonlethal methods or other methods not recommended by WS, contract for WS direct damage management services, use contractual services of private businesses, use volunteer services, or take no action. In some cases, damage management methods employed by others could be contrary to the intended use or in excess of what is necessary. Not all of the methods listed in Appendix B as potentially available to WS would be legally available to all other agencies or individuals (e.g., M-44's and LPCs).

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<sup>2</sup>Gunshot is an American Veterinary Medical Association (AVMA) approved euthanasia method which is sometimes used to euthanize large mammals which are captured in live traps (Andrews et al. 1993).

### **3.1.5 Alternative 5 - No Federal WS VCCDCP.**

This alternative would eliminate federal involvement in VCCDCP in Virginia. WS would not provide direct operational or technical assistance and requesters of WS services would have to conduct their own VCCDCP without WS input. M-44's and LPCs are only legally available for use by WS employees. Therefore, use of these methods by private individuals and state and local government agency personnel would be illegal. Gas Cartridges could be used by private individuals and state and local government agency personnel.

## **3.2 VCCDCP STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN VIRGINIA**

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2, 3 and 4. Alternative 5 would terminate both WS technical assistance and operational VCCDCP. Appendix B is a more thorough description of the methods that could be used or recommended by WS.

### **3.2.1 Integrated Wildlife Damage Management (IWDM).**

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in a cost-effective<sup>3</sup> manner while minimizing the potentially harmful effects on humans, target and nontarget species, and the environment. IWDM may incorporate cultural practices (i.e., animal husbandry), habitat modification (i.e., exclusion), animal behavior modification (i.e., scaring), removal of individual offending animals, local groups, or any combination of these, depending on the circumstances of the specific damage problem.

### **3.2.2 The IWDM Strategies That WS Employs Under the Current VCCDCP Program -Alternative 1 (No Action/Proposed Action).**

#### **3.2.2.1 Technical Assistance Recommendations.**

“Technical assistance” as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods. The implementation of damage management actions is the responsibility of the requester. In some cases, WS provides supplies or materials that are of limited availability for non-WS entities to use. Technical assistance may be provided following a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need, and the practicality of their application.

Under APHIS NEPA Implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving predator damage problems.

#### **3.2.2.2 Direct Damage Management Assistance.**

This is the engagement of damage management activities by WS personnel. Direct damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone, and when *Agreements for Control* or other comparable instruments provide for WS direct damage

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<sup>3</sup>The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

management. The initial investigation defines the nature, history, extent of the problem, species responsible for the damage, and methods that would be available to resolve the problem. Professional skills of WS personnel are often required to effectively resolve problems, especially if restricted-use pesticides are necessary, or if the problem is complex.

WS's direct damage management assistance activities in resolving coyote, dog, or red fox predation on livestock have been mostly lethal because resource owners are best able to implement most nonlethal damage management themselves. WS is often asked to provide assistance to these same resource owners after their nonlethal or lethal methods fail to reduce damage to acceptable levels.

#### **3.2.2.3 Education efforts in Virginia.**

Education is an important element of WS program activities because wildlife damage management is about finding "balance" or co-existence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures and demonstrations are provided to farmers, homeowners, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are periodically updated on recent developments in damage management technology, laws and regulations, and agency policies.

WS provides informational leaflets about coyote, dog, or red fox predation damage management and biology and ecology, and about specific methods (e.g., sources of trapping supplies). In FYs 1994-1999, the WS program in Virginia provided 10,812 leaflets to the public about coyote, dog, or fox predation damage management, and methods.

#### **3.2.3 WS Decision Making.**

WS personnel use a thought process for evaluating and responding to damage complaints that is depicted by the WS Decision Model described by Slate et al. (1992) (Figure 3-1). WS personnel are frequently contacted after requesters have tried or considered nonlethal methods and found them to be impractical, too costly, or inadequate for reducing damage to an acceptable level. WS personnel assess the problem, evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situation are developed into a management strategy. After the management strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management is ended. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a documented process, but a mental problem-solving process common to most if not all professions.

### 3.2.4 Decision Making by Livestock Producers

The Virginia WS program follows the “Co-managerial approach” to solve wildlife damage or conflicts as described by Decker and Chase (1997). Within this management model, WS provides technical assistance regarding the biology and ecology of coyotes, dogs, or red fox and effective, practical, and reasonable methods available to the livestock producers to reduce predation on livestock. This includes nonlethal and lethal methods. Some technical assistance on alleviating damage caused by coyotes, dogs, or red fox is also available from VDACS, VDGIF, county animal control, and Virginia Cooperative Extension Service. WS and other state and federal wildlife or wildlife damage management agencies may facilitate discussions at local community meetings when resources are available. Livestock producers directly affected by coyote, dog, and red fox predation damage in Virginia have direct input into the resolution of such problems. They may implement management recommendations provided by WS or others, or may request management assistance from WS, other wildlife management agencies, local animal control agencies, or private businesses or organizations.

Livestock producers decide which method or groups of methods could be used to solve a livestock predation problem on their farm. These livestock producer decision makers include private property owners/managers, and public property managers.

### 3.2.5 Coyote, Dog, or Fox Predation Management Methods Available for Use or Recommended by WS. (See Appendix B for detailed descriptions of VCCDCP Methodologies)

#### 3.2.5.1 Nonchemical, Nonlethal Methods (See Appendix B for detailed descriptions)

**Livestock producer implemented methods** consist primarily of nonlethal preventive methods such as cultural methods<sup>4</sup> and habitat modification.

**Animal Husbandry** practices include modifications in the level of care or attention given to livestock (depending on the age and size of the flock or herd). Animal husbandry practices include, but are not limited to the use of:

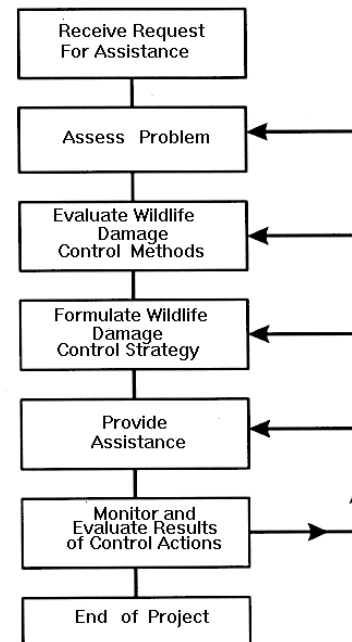
- Guard animals
- Herders
- Shed lambing
- Carcass removal
- Pasture selection

**Habitat modification** to reduce cover sought by coyotes or red fox.

- Cut fields of tall grass and forbes to reduce natural cover

**Animal behavior modification** refers to tactics that alter the behavior of coyotes, dogs, and red fox to

**Figure 3-1. APHIS, WS Decision Model**



<sup>4</sup>. Generally involves modifications to the management of protected resources to reduce their vulnerability to wildlife damage.

reduce damages. Some but not all of these tactics include:

- Exclusions such as fencing
- Strobe sirens (to scare coyotes, dogs, and red fox from lambing or bedding grounds)

### **3.2.5.2 Mechanical Management Methods (See Appendix B for detailed descriptions)**

**Leg-hold traps** can be utilized to live-capture a variety of mammals, but are most often used in Virginia to capture coyotes, dogs, and red foxes. The use of leg-hold traps also requires more time, expertise, and labor than some methods, but they are indispensable in resolving many depredation problems. Leg-hold traps consist of two opposing steel jaws hinged to a base plate that are held closed by 2 or 4 lever or music wire-coil springs. When the trap is set, the jaws are held open by a triggering device which is a circular or rectangular pan centered between the hinged jaws. The pan must be depressed by the animal's foot for the jaws to be closed shut by the springs. Modifications have occurred to improve animal welfare including adding pan-tension devices to exclude nontarget animals, center swiveling to reduce injuries from twisting, and shock springs in the chain which anchors the trap to reduce lunging injuries. Jaws are without teeth and may have rubber pads attached. Jaws may be offset to keep them from coming together which reduces pressure on the animal's foot. Also, the thickness of the jaws may vary to better distribute pressure on the animal's foot. Novak (1987) and Boggess et al.(1990) describe and diagram many types of leg-hold traps used throughout history in North America. Traps that are available for VCCDCP include the padded jaw and steel leg-hold trap.

**Cage traps**, typically constructed of wire mesh or plastic, and are sometimes used or recommended to capture dogs. Cage traps are baited with a meat type bait to capture dogs. Cage traps, however, cannot be used effectively to capture wary predators such as coyotes and red foxes.

**Snares** are generally made of small diameter wire cable (e.g., 5/64 or 3/32 inch diameter) with a locking mechanism which holds the snare closed after an animal pulls the snare closed with its foot or body. They weigh only a few ounces and usually are not as affected by inclement weather. Snares are generally placed to capture the target animal during its normal movement patterns. Snares for coyotes, dogs, and red foxes depredating livestock generally are set in crawl holes under fences. Snares can be set to catch an animal by the neck, which is generally lethal to fox and coyotes, but not dogs. Infrequently, they are also set in trails to foot or leg snare these predators. When used in this manner, they can be useful live capture devices.

**Shooting** is the practice of selectively removing target coyotes, dogs, or red foxes by shooting with a shotgun or rifle. Shooting with rifles or shotguns is used to manage coyote, dog, or red fox predation problems when lethal methods are determined to be appropriate. Shooting may involve the use of spotlights, night-vision, decoy dogs, and predator calling. The target species is killed as quickly and humanely as possible.

**Hunting/decoy dogs** are sometimes trained and used for coyote damage management to alleviate livestock depredation (Rowley and Rowley 1987, Coolahan 1990). Trained dogs are used primarily to find coyotes and dens and to pursue or decoy problem animals. Dogs could be essential to the successful location of coyote sign (tracks, hair, or droppings).

**Denning** is the practice of finding coyote or red fox dens and eliminating the young, adults, or both to stop an ongoing predation problem or prevent future depredation on livestock. Coyote and red fox depredations on livestock often increase in the spring and early summer due to the increased food requirements associated with feeding and rearing litters of pups. Removal of pups will often stop depredations even if the adults are not taken (Till 1992). Pups are typically euthanized in the den using a

registered gas fumigant cartridge (see discussion of Large Gas Cartridge under *Chemical Management Methods*).

**Sport hunting and regulated trapping** can be part of a VCCDCP strategy to reduce local coyote or fox populations. Although WS does not use sport hunting and regulated trapping, it recommends, where appropriate, sport hunting and regulated trapping to alleviate coyote or fox damage. Hunters and trappers can provide a societal benefit by reducing local wild animal populations which can reduce damage (Conover 2001)(Organ et. al. 1996).

### **3.2.5.3 Chemical, Lethal Methods (See Appendix B for detailed descriptions)**

The **M-44** is a spring-activated ejector device developed specifically to kill coyotes and it is registered with the EPA (EPA Reg No. 56228-15) to kill coyotes, foxes, and feral dogs which are suspected of preying upon livestock. The M-44 consists of a capsule holder wrapped in an absorbent material, an ejector mechanism, a capsule containing about 0.9 grams of a powdered sodium cyanide mixture, a fluorescent marker, and a 6-7 inch hollow stake. To set a M-44, a suitable location is found, the hollow stake is driven into the ground, and the ejector unit is cocked and fastened into the stake by a slip ring. The wrapped capsule holder containing the cyanide capsule is then screwed onto the ejector unit and a coyote attractant is applied to the capsule holder. A canine attracted to the bait will try to bite and pick up the baited capsule holder. When the M-44 capsule holder is pulled, the spring-activated plunger propels sodium cyanide into the animal's mouth, resulting in death within seconds. Coyotes killed by M-44s present no secondary poisoning risks (USDA 1997revised, Appendix P, pgs. 269-271). M-44s are specific to canids, but other animals (e.g., raccoons, opossums) may pull the M-44 and may or may not receive a lethal dose of sodium cyanide because they pull the M-44 from the side and little or no sodium cyanide enters the mouth. This chemical would be the primary lethal chemical method used for VCCDCP under the current program.

**Livestock Protection Collars** consists of Velcro straps with two rubber reservoirs attached to them, each of which contains 15 milliliters of a 1% solution of sodium fluoroacetate (Compound 1080). The Velcro straps attach around the neck of a sheep or goat with the reservoirs positioned just behind the jaw. Two sizes of collars are available to accommodate various size livestock.

Coyotes typically attack sheep and goats by biting them on the throat and crushing the larynx, causing suffocation (Connolly et al 1976). Coyotes that attack collared sheep generally puncture the collar (in 75% or more of attacks) with their teeth and receive a lethal oral dose of toxicant.

Use of the LPC involves the establishment of a "target flock" of 20-50 collared lambs and their ewes. These animals are placed in a high risk pasture where recent coyote attacks have occurred. Other (uncollared) livestock on the farm are moved to a safe area or are penned until predation stops.

The **Large Gas Cartridges** are a fumigant used in conjunction with denning operations in Virginia. When ignited, the cartridge burns in the den of an animal and produces large amounts of carbon monoxide, a colorless, odorless, and tasteless, toxic gas. The combination of oxygen depletion and carbon monoxide exposure kills the animals in the den.

### **3.2.6 Strategies and methods available for Alternative 2 - Nonlethal VCCDCP Only By WS**

This alternative would require that WS only utilize nonlethal methods (3.2.5.1) to resolve coyote, red fox, and dog damage problems, including nonlethal technical assistance recommendations. Producers, state agency personnel, or others could conduct VCCDCP activities including the use of traps, shooting, and any lethal or

nonlethal methods they deem effective . However, M-44s and LPCs are currently only available in Virginia for use by WS employees. Therefore, use of these chemicals by private individuals or state and local agencies would be illegal.

### **3.2.7 Strategies and methods available for Alternative 3 - Technical Assistance Only**

This alternative would not allow WS operational VCCDCP in the State. WS would only provide technical assistance and make recommendations when requested. Producers, state agency personnel, or others could conduct VCCDCP activities including the use of traps, shooting, and any lethal or nonlethal methods they deem effective. However, M-44s and LPCs are currently only available in Virginia for use by WS employees. Therefore use of these chemicals by private individuals or state and local agencies would be illegal.

### **3.2.8 Strategies and methods available for Alternative 4 - Lethal VCCDCP Only By WS**

This alternative would require that WS only utilize lethal control methods (3.2.5.2 and 3.2.5.4) in addressing coyote, red fox, and dog damage problems, including lethal technical assistance recommendations. Producers, state agency personnel, or others could conduct VCCDCP activities including the use of traps, shooting, and any lethal or nonlethal methods they deem effective. M-44s and LPCs would be available for use only by WS employees.

### **3.2.9 Strategies and methods available for Alternative 5 - No Federal WS VCCDCP**

This alternative would consist of no federal involvement in VCCDCP in the State. Neither direct operational management assistance nor technical assistance to provide information on nonlethal and/or lethal management techniques would be available from WS. Producers, state agency personnel, or others would be left with the option to conduct VCCDCP activities including the use of traps, shooting, and any lethal or nonlethal methods they deem effective with the exception of M-44s and LPCs which are currently only available in Virginia for use by WS employees. Therefore use of these chemical methods by private individuals or state and local agencies would be illegal.

## **3.3 Alternatives Considered but not in Detail, with Rationale**

### **3.3.1 Compensation for Wildlife Damage Losses**

The compensation alternative would direct all Virginia WS program efforts and resources toward the verification of livestock losses from coyotes, red foxes, and dogs, and to providing monetary compensation for these losses. Virginia WS activities would not include any operational damage management or technical assistance.

This option is not currently available to Virginia WS because WS is directed and authorized by law to protect American agricultural and natural resources, property and public health and safety (Animal Damage Control Act of 1931, as amended; and the Rural Development, Agricultural and Related Agencies Appropriation Act of 1988). Analysis of this alternative in USDA (1997) shows that it has many drawbacks:

- Compensation would not be practical for public health and safety problems,
- It would require larger expenditures of money to investigate and validate all losses, and to determine and administer appropriate compensation,
- Timely responses to all requests to assess and confirm losses would be difficult, and many losses could not be verified,
- Compensation would give little incentive to limit losses through other management strategies,
- Not all resources managers/owners would rely completely on a compensation program and unregulated



- lethal control would probably continue and escalate,
- Neither Congress nor the Commonwealth of Virginia has appropriated funds for a compensation program.

Without the current VCCDCP, projected sheep losses alone could amount to over 11,430 head at \$97/head or \$1.1 million (see Chapter 2 “2.3.2 Cost effectiveness of coyote damage management”). A compensation program would require funding over the projected \$1.1 million. The figure of \$1.1 million does not include expenditures for administration and investigation for the validation of losses or compensation for losses of cattle, goats, or other livestock.

During FY98 the VCCDCP spent \$92,000 to protect livestock from coyote, dog, and fox predation. A cost benefit analysis determined that for every dollar spent, up to \$10.35 was saved. However, sheep losses still amounted to over \$63,000 with the assistance of the VCCDCP. A more economical approach to a \$1.1 million plus compensation program would be to increase VCCDCP funding to properly to meet the demand for services.

### **3.3.2 Coyote Bounties**

Legislation was passed in the 1999 Session of the Virginia General Assembly authorizing counties the option of establishing their own coyote bounty system. To date, Lee, Scott, Tazewell, Buchanan, Giles, Bath, and Warren Counties have established a bounty system on coyotes. After one season of experience with the bounty system, one county has rescinded the bounty and others are considering the same. Payment of funds for killing coyotes (bounties) is not supported by WS because:

- Bounties are not effective in reducing damage.
- Circumstances surrounding take of animals is largely unregulated.
- No process exists to prohibit taking of animals from outside the damage management area for compensation purposes.
- Bounty hunters may mistakes dogs and foxes as coyotes.
- Official responsible for checking in coyotes may mistake dogs and foxes as coyotes.
- Coyote bounties have a long history (>100 years in the U.S.) of use in many states without ever achieving the intended results of reducing damage and population levels (Parker 1995).

In 1999-2000, Virginia counties allocated \$22,500 on coyote bounties. If these funds were re-directed to improve the VCCDCP, the cost benefit ratio on sheep alone at \$10.35:1 (see Chapter 2 “2.3.2 Cost effectiveness of coyote damage management”) could be further improved to reduce livestock depredations. The overwhelmingly disadvantage of coyote bounties is the mis-direction of funds meant to, but not effectively and economically able to, reduce coyote damage to livestock.

## **3.4 Mitigation and SOPs for Coyote, Fox, and Dog Damage Management**

### **3.4.1 Mitigation in SOPs**

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current WS program, nationwide and in Virginia, uses many such mitigation measures and these are discussed in more detail in Chapter 5 of the FEIS (USDA 1997revised). Some key mitigating measures pertinent to the proposed action and alternatives that are incorporated into WS's SOPs include:

- The WS Decision Model thought process is used to identify effective wildlife damage management strategies and their impacts.

- Reasonable and prudent measures and alternatives are identified through consultation with the FWS and are implemented to avoid impacts to T&E species.
- EPA-approved label directions are followed for all pesticide use. The registration process for chemical pesticides is intended to assure minimal adverse impacts to the environment when chemicals are used in accordance with label directions.
- All WS Specialists in the state who use restricted chemicals are trained and certified by, program personnel or others who are experts in the safe and effective use of chemical VCCDCP materials.
- Research is being conducted to improve VCCDCP methods and strategies to increase selectivity for target species, to develop effective nonlethal damage management methods, and to evaluate nontarget hazards and environmental impacts.
- Preference is given to nonlethal methods, when practical and effective. If practical and effective nonlethal damage management methods are not available and if lethal methods are available and appropriate for WS to implement, WS may implement lethal methods.

Some additional mitigating factors specific to the current program include:

- Generalized population suppression across the state, or even across major portions of the state, would not be conducted.
- WS uses damage management devices and conducts activities for which the risk of hazards to public safety and environment have been determined to be low (USDA 1997 revised, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazard to the public is even further reduced.

### 3.4.2 Additional Mitigation Specific to the Issues

The following is a summary of additional mitigation measures that are specific to the issues listed in Chapter 2 of this document.

MITIGATION MEASURES	ALTERNATIVES				
	1	2	3	4	5
<b>EFFECTS ON TARGET AND NONTARGET WILDLIFE POPULATIONS, INCLUDING T&amp;E SPECIES</b>					
WS consulted with the FWS regarding the nationwide program and livestock protection and would continue to implement all applicable measures identified by the FWS to ensure protection of T&E species.	X	X	X	X	
The VDGIF provided information in the development of this EA and the VCCDCP, and was consulted to mitigate impacts to T&E species.	X	X	X	X	
Actions will be taken against individual problem animals, local populations or groups.	X	X		X	
Animals taken by WS would be considered with the statewide total harvest when estimating the impact on native wildlife species. This data would be used to maintain a magnitude of harvest below the level that would affect the viability of a native population.	X	X		X	
No leg-hold traps would be set within 30 feet of an exposed carcasses to preclude capture of eagles or other birds.	X			X	

Leg-hold traps will incorporate pan-tension devices to avoid capture of nontarget species.	X			X	
Leg-hold traps used are those likely to reduce foot injuries to captured animals because of modifications or trap design.	X			X	
Leg-hold traps and snares are checked on a 24-hour basis.	X			X	
Leghold traps are without teeth.	X			X	
Snares will not be placed in fence holes or crawls that deer are habitually using.	X			X	
The use of traps and snares would conform to current laws and regulations administered by VDGIF and WS policy.	X			X	
M-44's are placed within fenced areas where livestock graze to target offending predators and to reduce exposure to other wildlife.	X			X	
Healthy and uninjured nontarget animals captured in traps and snares will be released.	X			X	
The Decision Model (Slate et al. 1992) designed to identify the most appropriate damage management strategies and their impacts would be used to determine damage management strategies to minimize impacts on nontarget wildlife and avoid impacts on T&E species.	X			X	
<b>EFFECTS ON DOGS</b>					
M-44's will not be set from September 1 through January 7 to avoid possible exposure to hunting dogs.	X			X	
M-44's are set within fenced areas where nontarget dogs are likely to be excluded.	X			X	
Warning signs are placed at the main entry of farms where M-44's are set to warn dog owners.	X			X	
Warning signs are placed within 25 feet of each M-44 to warn dog owners.	X			X	
Livestock producers are requested to notify neighbors with dogs that M-44's have been placed within fenced areas and their dogs should be restrained from roaming at large.	X			X	
Livestock producers are instructed to notify hunters requesting and receiving permission to hunt that M-44's, snares, traps, and other methods are in use on the farm.	X			X	
Captured dogs will be returned to the owner by local animal control if the dog wears identification and is known not to be the offending predator.	X			X	
<b>EFFECTS ON HUMAN HEALTH AND SAFETY</b>					
All pesticides used by WS would be registered with EPA and VDACS	X			X	

EPA approved label directions would be followed by WS for all pesticides used in Virginia	X			X	
The Decision Model (Slate et al. 1992) designed to identify the most appropriate damage management strategies and their impacts would be used to determine coyote, dog, and fox damage management strategies.	X		X	X	
WS employees who use pesticides would participate in VDACS approved continuing education to keep abreast of developments and maintain their certifications.	X			X	
All WS restricted-use pesticide applicators will be certified by VDACS	X			X	
All WS employees using M-44's will carry antidote kits at all times.	X			X	
All WS employees using M-44's will wear leather gloves and safety glasses.	X			X	
All WS employees using M-44's will receive training annually.	X			X	
WS has contacted the Blue Ridge Poison Center who has agreed to contact hospitals in areas worked by WS to inform them about the use of sodium cyanide (M-44) and sodium fluoracetate (LPC) in the counties.	X			X	
Warning signs indicating the placement of traps, snares, M-44's, or LPCs on a farm will be placed at the main entrance.	X			X	
All LPC applicators will wear waterproof protective gloves when handling collared sheep or goats.	X			X	
All LPC applicators will pass a written test prior to receiving certification to use LPC's.	X			X	
All employees will receive firearms refresher training at least every 3 years.	X			X	
<b>IMPACTS TO STAKEHOLDERS, INCLUDING AESTHETICS</b>					
Dead animals will be kept from public view when placed in government vehicles traveling on public roads.	X			X	
Dead animals will not be disposed of in locations where the public is likely to see the animals.	X			X	
WS employees will avoid euthanizing animals when the public is present.	X			X	
Breakaway snares will be used in the VCCDCP when set in fences encompassing pastures with livestock.	X			X	



## CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

### 4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. The chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This chapter analyzes the environmental consequences of each alternative in comparison with the proposed action to determine if the real or potential impacts would be greater, lesser, or the same. Therefore, the proposed action or current program alternative serves as the baseline for the analysis and the comparison of expected impacts among the alternatives. The analysis also takes into consideration WS mandates, directives, and the procedures used in the WS decision process (USDA 1997revised).

The following resource values in Virginia are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, floodplains, wetlands, visual resources, critical habitat (areas listed in T&E species recovery plans), air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

**Cumulative Impacts:** Discussed in relationship to each of the potentially affected species analyzed in this chapter.

**Irreversible and Irretrievable Commitments of Resources:** Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

**Impacts on sites or resources protected under the National Historic Preservation Act:** WS VCCDCP actions are not undertakings that could adversely affect historic resources (See Section 1.8.2.4).

### 4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

#### 4.1.1 Effects on Coyote and Red Fox Populations

##### 4.1.1.1 Alternative 1. - Continue the Current Federal VCCDCP/ Integrated Wildlife Damage Management (The No Action/Proposed Action).

Analysis of this issue is limited to coyotes and red foxes killed during the VCCDCP. The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997revised). Magnitude is described in USDA (1997revised) as "*... a measure of the number of animals killed in relation to their abundance.*" Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and only after they have caused damage.

##### Ecology of coyotes

Prior to 1900, the distribution of the coyote was mainly limited to the short grass prairie region of the western United States (Parker 1995). Two separate colonization events occurred on a northern and southern front as coyotes expanded their range into the eastern United States (Parker 1995, Moore and Parker 1992). The northern front began at the turn of the century as wolves were extirpated and habitat changes (i.e., clearing of forests) left a niche filled by coyotes (Parker 1995). On the southern front, the main thrust of the expanding coyote population did not cross the Mississippi River basin until the 1960s (Parker 1995). The extirpation of the red wolf and the loss of forest habitat in the south was also

favorable for coyotes (Parker 1995). By 1980, coyotes were established in parts of Virginia with records of coyotes existing back to the 1950s. Several unsubstantiated and substantiated cases that coyotes from western states were being released in the eastern United States for sporting purposes also occurred between 1925 and 1987. Some of those releases occurred in Virginia (Linzey 1998, Hill et. al. 1987) and the coyote now exists statewide (Linzey 1998).

Eastern coyotes are generally larger and darker than western coyotes. In Virginia, an adult male coyote weighs an average of 35 pounds while adult females average 29 pounds (Houben and Mason 1998, unpubl. report). The color of coyotes in Virginia ranges from creamy white to melanistic with red-brown to gray being most common. While melanism has been considered a diagnostic feature useful for determining red wolves from coyotes (Parker 1995), Gipson (1978) suggests melanistic coyotes are the result of hybridization among coyotes and red wolves. A larger prey base and hybridization events with red and gray wolves and dogs have no doubt contributed to the difference in size and color variation between eastern and western coyotes (Parker 1995).

Food habits of eastern coyotes include white-tailed deer, rabbits and rodents, fruits and berries, livestock, birds, and carrion (Linzey 1998). The white-tailed deer may provide up to 60% of a coyotes diet from January through April and up to 70% in June and July when fawns are especially vulnerable (Witmer et. al. 1995, Lavigne 1992, Blanton and Hill 1989). Another study showed that the diet of eastern coyotes is comprised of up to 90% deer during certain times of the year (Ozoga 1966).

Coyotes breed in late-January through February. After a 63 day gestation cycle, an average of 5 to 7 pups are born (Chambers 1992). Both adults feed the pups with the possibility of unmated coyotes living in the group contributing as well (Snow 1967 in Parker 1995). The pups usually stay with the adults through the fall and may disperse before the next breeding cycle in February. Eighty-seven percent of the juveniles will disperse after 12 months, and all by 19 months (Lorenz 1978). Radio-collared juveniles dispersed from October through January a distance of 10-42 miles with an average of 30 miles (Berg and Chesness 1978).

The cost to accurately determine absolute coyote densities over large areas would be prohibitive (Connolly 1992b) and would not appear to be warranted for this EA given the coyote's relative abundance. Because determinations of absolute coyote densities are frequently limited to educated guesses (Knowlton 1972), many researchers have estimated coyote populations throughout the west and east (Pyrah 1984, Camenzind 1978, Knowlton 1972, Clark 1972, USDI 1979). The presence of unusual food concentrations and non-breeding helpers at the den can influence coyote densities and complicate efforts to estimate abundance (Danner and Smith 1980). Coyote densities range from 0.2/mi<sup>2</sup> when populations are low (pre-whelping) to 3.6/mi<sup>2</sup> when populations are high (post-whelping) (USDI 1979, Knowlton 1972). Knowlton (1972) concluded that coyote densities may approach a high of 5-6/mi<sup>2</sup> under extremely favorable conditions with densities of 0.5 to 1.0/mi<sup>2</sup> possible throughout much of their range.

The literature on coyote spatial organization is confusing (Windberg and Knowlton 1988, Messier and Barrette 1982). Coyotes are highly mobile animals with home ranges that vary by sex, age of the animal, and season of the year (Pyrah 1984, Althoff 1978, Todd and Keith 1976). Coyote home ranges may vary from 2.0 to 21.3 mi<sup>2</sup> (Andelt and Gipson 1979, Gese et al. 1988<sup>5</sup>). Ozoga and Harger (1966), Edwards (1975), and Danner (1976) observed overlap between coyote home ranges and did not consider coyotes to be territorial. Other studies have shown that coyotes occupy territories and that each territory may have several non-breeding helpers at the den during whelping (Allen, et al. 1987, Bekoff and Wells 1982).

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Therefore, each coyote territory may support more than just a pair of coyotes. Gese et al. (1988) reported that coyote groups of 2, 3, 4, and 5 comprised 40%, 37%, 10% and 6% of the resident population, respectively, and Messier and Barrette (1982) reported that during November through April, 35% of the coyotes were in groups of 3 to 5 animals.

The unique resilience of the coyote, its ability to adapt, and its perseverance under adverse conditions is commonly recognized among biologists and land managers. Despite intensive historical damage management efforts in livestock production areas and despite sport hunting and trapping for fur, coyotes continue to thrive and expand their range, occurring widely across North and Central America (Miller 1995). Connolly and Longhurst (1975) determined that, "... *if 75% of the coyotes are killed each year, the population would be exterminated in slightly over 50 years.*" However, the authors go on to explain that their "*model suggests that coyotes, through compensatory reproduction, can withstand an annual population mortality of 70%*" and that coyote populations would regain pre-control densities (through recruitment, reproduction and migration) by the end of the fifth year after control was terminated even though 75% mortality had occurred for 20 years. In addition, other researchers (Windberg and Knowlton 1988) recognized that immigration, (not considered in the Connolly and Longhurst (1975) model) can result in rapid occupancy of vacant territories, which helps to explain why coyotes have thrived in spite of early efforts to exterminate them (Connolly 1978).

### **Ecology of red fox**

Red fox are the most common and well-known species in the genus *Vulpes* and are the most widely distributed nonspecific predators in the world (Voigt 1987). The red fox occurs throughout Virginia and prefers diverse habitat that is made up of a patchwork of woodlots, opens meadows, dense brushlands, pastures, and small wetlands (Henry 1986). Red fox were native to North America north of latitude 40° (Churcher 1959). European red fox were introduced beginning in the late 1600s along with North American red fox introductions to the southern states for sporting purposes (Linzey 1998); therefore, the red fox in Virginia most likely has a mixed heritage of native red fox and European red fox (Linzey 1998, Samuel and Nelson 1982).

Red fox are regarded as nuisance predators in many regions, preying on wildlife and livestock, and have become notorious in many areas of the world as carriers of diseases (Ables 1969, Andrews et al. 1973, Tabel et al. 1974, Tullar et al. 1976, Pils and Martin 1978, Sargeant 1978, Voigt 1987, Allen and Sargeant 1993). Red fox have been the subject of many studies during the last 20 years and investigations have revealed that fox are extremely adaptive and diverse in their behavior and use of habitats. For example, Voigt and Earle (1983) and Gese et al. (1996) showed that red fox were adaptive enough to avoid coyotes while coexisting in the same area and habitats.

Adult red fox normally weigh between 6 and 15 pounds. The dorsal pelage is normally rusty-reddish to reddish-yellow intermixed with dark hairs in the middle of the back, while the fronts of the legs, feet, and back of ears are black, and the tail tip is white. The under parts are whitish or grayish-white. Three color phases have been reported: "cross" (pelage is mixed with gray and yellow, and gets its name from black cross formed by a line down the mid-back and another across the shoulders), "silver" (melanistic coat frosted with white), and "black" phases that are progressively darker. Red foxes feeding habits are governed by the relative availability of foods with rabbits and mice usually making up over half of the food consumed (Nelson 1933). Other foods include, squirrels, muskrats, quail, song birds, insects, fruits and nuts (Linzey 1998, Baker 1983).

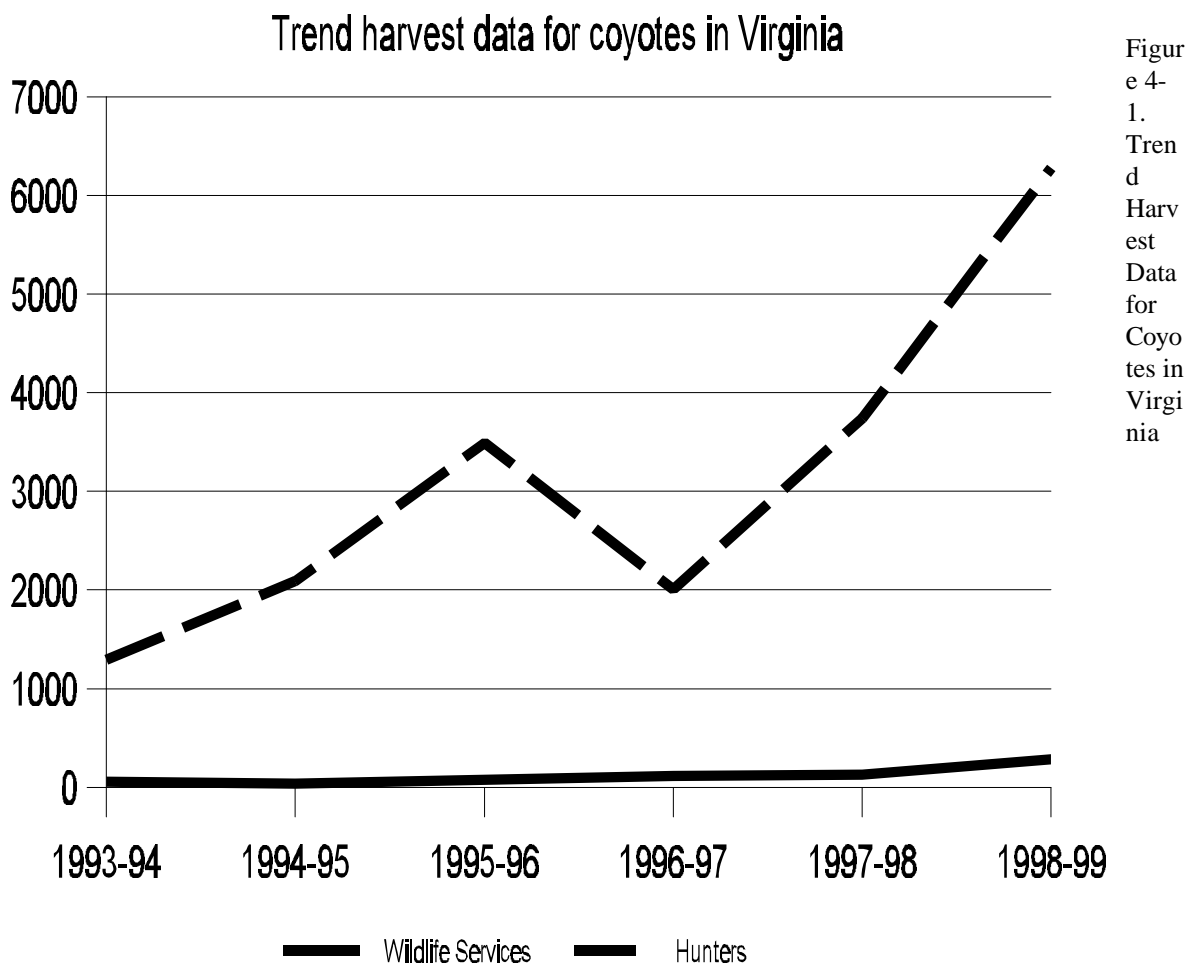
Red fox densities are difficult to determine because of the species' secretive and elusive nature. However, researchers have documented that red fox have high reproductive and dispersal rates and thus, can withstand high mortality (Allen and Sargeant 1993, Voigt 1987, Voigt and MacDonald 1984, Harris



1979, Pils and Martin 1978, Storm et al. 1976, Andrews et al. 1973, Phillips and Mech 1970). Storm et al. (1976) stated that 95% of red fox females (44% were less than 1 year old) bred successfully in a population in Illinois and Iowa. Rowlands and Parkes (1935) and Creed (1960) reported that male red fox successfully bred females during their first year. Red foxes average 4.7 pups per litter with litters of 14 to 17 pups documented (Storm et al. 1976, Voigt 1987). Ables (1969) and Sheldon (1950) reported that more than 1 female was observed at the den and suggested that red fox have "*helpers*" that assist with raising pups, a phenomena observed in coyotes and other canids. Red fox population densities ranged from more than 50/mi<sup>2</sup> (Harris 1977, Harris and Rayner 1986, MacDonald and Newdick 1982) where food was abundant, to 2.6/mi<sup>2</sup> in Ontario (Voigt 1987), and to 1 fox den/3 mi<sup>2</sup> in Nebraska (Sargeant 1972).

Dispersal serves to equalize fox densities over large areas. Annual harvests in localized areas in 1 or more years will likely have little impact on the overall population in subsequent years, but may reduce localized predation (Allen and Sargeant 1993). Phillips (1970) stated that fox populations are resilient and for fox control (by trapping) to be successful, pressure on the population must be almost continuous. Phillips (1970) and Voigt (1987) also concluded that habitat destruction affects fox populations to a greater extent than short-term over-harvest.

#### Coyote and red fox harvest in Virginia



VDGIF provided hunter harvest data, but was unable to provide any definitive estimates of population sizes for purposes of the following analysis on impacts to the population. Therefore, WS used the best available information to produce a reasonable population impact analysis.

Coyote populations in Virginia are considered increasing based on trends in hunter harvest surveys according to the VDGIF (Figure 4-1). VDGIF, the state authority responsible for monitoring and managing coyotes in Virginia believes coyotes are increasing. Red fox populations in Virginia are considered stable by VDGIF. However, hunter harvest trends combined with hunter effort indexes indicate a decreasing red fox harvest since 1993 (Table 4-1).

Table 4-1. Trend harvest data for red fox killed by Wildlife Services (WS) and hunters in Virginia. Red Fox killed by WS was from all damage management programs including Virginia Cooperative Coyote Damage Control Program (VCCDCP).

<u>Year</u>	<u>Wildlife Services take</u>	<u>Hunter harvest</u>
1993-94	0	11,890
1994-95	10	17,497
1995-96	25	22,227
1996-97	42	19,190
1997-98	58	24,359
1998-99	114 <sup>1</sup>	17,315

1. Only 73 red fox were taken in the VCCDCP. The remainder of the fox were taken in other WS programs to protect different resources.

Table 4-2. The estimated number of coyote and red fox legally killed by hunters and trappers during regulated hunting/ trapping seasons and Wildlife Services during fiscal years 1998 and 1999 in Virginia. The Virginia Department of Game and Inland Fisheries measures hunter harvest through surveys (Wright et al. 1999). Trapper harvest is from unpublished data.

<u>Year</u>	<u>WS take</u>		<u>Hunter harvest</u>		<u>Trapper harvest</u>	
	<u>Coyotes</u>	<u>Red fox</u>	<u>Coyotes</u>	<u>Red fox</u>	<u>Coyotes</u>	<u>Red fox</u>
1997-1998	129	58	3,739	24,359	24	2,328
1998-1999	284	114 <sup>1</sup>	6,277	17,315	4	1,072

1. Only 73 red fox were taken in the Virginia Cooperative Coyote Damage Control Program. The remainder of the fox were taken in other WS programs to protect different resources.

### **Coyote and red fox population impact analysis**

#### Coyotes

Coyotes are a nuisance species (4 VAC §§15-20-160 pursuant to §§29.1-100) and non-native furbearer legally hunted and trapped in Virginia (Table 4-1). They are also a pest species killed by farmers and other citizens because of the damage they cause to livestock, agricultural crops, property, threats to human safety, or natural resources. The number of coyotes killed by farmers and other citizens is unknown and not measured by any survey.

WS lethally removed 129 coyotes in fiscal year (FY) 1998 as part of the VCCDCP which is only 3.3% of the total known take in Virginia. In FY 1999, WS killed 284 coyotes as part of the VCCDCP which is only 4.3% of the total known take in Virginia. Since WS has no authority or control over legal hunting and trapping or other mortality of coyotes in the State, the *status quo* for coyote populations and human-caused coyote mortality in Virginia is almost the same with or without the involvement of the federal program. This is further suggested by the likelihood that some of the coyotes killed by WS would be killed anyway since they were depredating animals. There is also the possibility that more coyotes would be killed in the absence of WS involvement if frustrated livestock producers resorted to misusing pesticides in attempts to stop coyote depredation.

WS has not adversely affected the coyote population in Virginia and the analysis indicates that its coyote take would be minor compared to sport and other depredation take allowed by the VDGIF. The VDGIF, as the agency with management responsibility for wildlife in Virginia has classified the coyote as a nuisance species and there are no restrictions on sport harvest and depredation harvest. Furthermore, even though there is no restriction on harvest, the coyote population and harvest increases each year suggesting the population is increasing (Wright et al. 1999, Wright and Emerald 1998, 1997, Wright and McFarland 1996, and Wright 1995).

WS used population trend analysis as an index of the magnitude of the harvest. Population trend analysis indicates coyote populations are increasing, thus the magnitude of impact is low. The WS magnitude is based on the fraction of total harvest attributed to the WS program. The number of coyotes harvested by hunters during the 1998 - 1999 hunting season was 6,277 coyotes (Table 4-1). WS killed 284 coyotes which would represent 4.3% of the total harvest and would be considered low magnitude.

#### Red fox

Red fox are a furbearer species (4 VAC §§15-20-160 pursuant to §§29.1-100) legally hunted and trapped in Virginia (Table 4-1). They also may be killed by landowners on their land at anytime (4 VAC §§15-110-80). They may also be killed by tenants because of the damage red fox cause to agricultural crops, property, threats to human health safety, or T&E species. The number of red fox killed by landowners

and other citizens is unknown and not measured by any survey.

WS lethally removed 58 red fox in FY 1998 as part of the VCCDCP and other WS take (e.g., airports, protecting T&E species), which is only 0.24% of all red fox taken by WS compared to hunters. In FY 1999, WS killed 73 red fox as part of the VCCDCP program and 41 in other WS programs (e.g., airports, protecting T&E species), which is only 0.6% of all red fox taken by WS and hunters. Since WS has no authority or control over legal hunting and trapping or other mortality of red fox in the state, the *status quo* for red fox populations and human-caused red fox mortality in Virginia is almost the same with or without the involvement of the federal program. This is further suggested by the likelihood that some of the red fox killed by WS would be killed since they were depredating animals. There is also the possibility that even more red fox could be killed in the absence of WS if frustrated livestock producers resorted to misusing pesticides in attempts to stop red fox depredation.

WS has not adversely affected the red fox population in Virginia and the analysis indicates that its red fox take would be minor compared to sport and other depredation take allowed by the VDGIF. The VDGIF, as the agency with management responsibility for wildlife in Virginia has classified the red fox as a furbearer and there are few restrictions on sport and depredation harvest. Even though there are few restrictions on harvest, the red fox harvest has been approximately stable each year (Wright et al. 1999, Wright and Emerald 1998, 1997, Wright and McFarland 1996, and Wright 1995). Furthermore, all data suggests that the red fox population is stable (VDGIF unpubl. data). However, when combined with hunter effort the red fox harvest has decreased since 1993.

WS used population trend analysis as an index of the magnitude of the impact. Population trend analysis indicates red fox populations are stable, thus the WS magnitude of impact is low. The WS impact is based on the fraction of total harvest attributed to the WS program. The number of red fox harvested by hunters during the 1998-1999 hunting season was 17,315 red fox (Table 4-1). WS killed 114 red fox in FY 1999 which would represent 0.66% of the total harvest and would be considered low magnitude of impact.

#### **4.1.1.2 Alternative 2 - Nonlethal VCCDCP Only By WS**

Under this alternative, WS would not kill any coyotes or red fox because only nonlethal methods would be used and only nonlethal technical assistance recommendations would be made. Although WS' take of coyotes and red fox would not occur, it is likely that, without WS conducting some level of lethal damage management activities, private damage management efforts would increase, leading to potentially similar or even greater cumulative impacts on target species populations than those of the current program. It is likely there could be misuse of pesticides to kill depredating coyotes or red fox because of the difficulty livestock producers may have in alleviating depredation with conventional damage management methods. For the same reasons shown in the population impacts analysis in section 4.1.1.1, however, it is unlikely that coyote or red fox populations would be adversely impacted by implementation of this alternative. M-44's and LPC's are currently only available for use by WS employees and would not be available under this Alternative. Impacts and hypothetical risks of illegal toxicant use under this alternative would probably be greater than the proposed action, about the same as Alternative 3, but less than under Alternative 5.

#### **4.1.1.3 Alternative 3 - Technical Assistance Only**

Under this alternative, WS would have no impact on coyote or red fox populations in the State because the program would not conduct any operational VCCDCP activities but would be limited to providing advice only. Private efforts to reduce or prevent coyote or red fox predation on livestock would increase which could result in similar or even greater impacts on those populations because of misuse of pesticides than the current program alternative. For the same reasons shown in the population impacts analysis in section

4.1.1.1, however, it is unlikely that coyote or red fox populations would be impacted significantly by implementation of this alternative. M-44's and LPC's are currently only available for use by WS employees and would not be available under this Alternative. It is possible that frustration caused by the inability to reduce losses could lead to illegal use of other chemicals which could lead to real but unknown impacts on coyote and red fox populations. Impacts and hypothetical risks of illegal toxicant use under this alternative would probably be similar as those under Alternative 2.

#### **4.1.1.4 Alternative 4 - Lethal VCCDCP Only By WS**

Under this alternative, WS would likely have the same impact on the coyote and red fox population in Virginia as Alternative 1 (No Action/Proposed Action). Only lethal VCCDCP activities would be implemented to resolve coyote or red fox predation on livestock in all situations. WS would not recommend or use any nonlethal VCCDCP methods to reduce coyote or red fox predation on livestock within Virginia. It is likely that a greater number of coyotes or red fox would have to be removed lethally to attempt to achieve the same results as the proposed action. For the same reasons shown in the population impacts analysis in section 4.1.1.1, however, it is unlikely that coyote or red fox populations would be impacted significantly by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce losses to acceptable levels could lead to illegal use of other chemicals which could lead to real but unknown impacts on coyote or red fox populations. Impacts and hypothetical risks of illegal toxicant use under this alternative would probably be similar as those under Alternative 1.

#### **4.1.1.5 Alternative 5 - No Federal WS VCCDCP**

Under this alternative, WS would have no impact on coyote and red fox populations in Virginia. Private efforts to reduce or prevent depredations could increase which could result in impacts on coyote and red fox populations to an unknown degree. Impacts on coyote and red fox under this alternative could be the same, less, or more than those of the proposed action depending on the level of effort expended. For the same reasons shown in the population impacts analysis in section 4.1.1.1, it is unlikely that coyote or red fox populations would be adversely impacted by implementation of this alternative. M-44's and LPC's are currently only available for use by WS employees and would not be available under this Alternative. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of other chemicals which could lead to real but unknown impacts on coyote or red fox populations.

### **4.1.2 Effects on Nontarget Wildlife Populations, including T&E Species.**

#### **4.1.2.1 Alternative 1 - Continue the Current Federal VCCDCP/Integrated Wildlife Damage Management (The No Action/Proposed Action)**

Adverse Impacts on Nontarget (non-T&E) Species. WS has taken non-target species during VCCDCP activities and the take has been minimal in relation to the total population (VDGIF pers. comm. 2001)(Table 4-3). These occurrences should not affect the overall populations of any species under the current program. The non-target species which are most likely to be killed by M-44's, traps, and snares are raccoons and grey foxes (Table 4-3). Some animals captured in traps and snares which would have been released by WS are killed by landowners and unknown persons.

#### Beneficial Impacts on Nontarget Species, including T&E Species.

WS activities in the VCCDCP would benefit some species that are preyed upon by coyotes and red fox. The benefits would be highly localized and most likely on the livestock producer's property WS is assisting or on adjacent property. The wildlife species most likely to benefit are deer, ground hogs, voles,

and rabbits because of the reduced threat of predation by coyotes, dogs, and red fox.

Other wildlife species, i.e. mice and ground nesting birds, etc. would benefit as well because WS uses specialized equipment and highly skilled and knowledgeable employees when resolving coyote, dog, and red fox predation on livestock. WS' expertise and equipment would reduce the number of nontarget animals captured had the private sector or individuals been trying to alleviate the same livestock predation.

T&E Species Impacts. WS VCCDCP expects no adverse impacts on any of the listed birds, mammals, invertebrates, fish, reptiles, amphibians, or plants in Virginia. Mitigation measures are in place to ensure no impact on T & E species.

The 1992 Biological Opinion (B.O.) (USDI 1992) (USDA 1997revised, Appendix F) and Informal Section 7 Consultations from the FWS concluded that no T& E species would be adversely affected by any aspect of the WS program

Mitigation measures to avoid T&E impacts were described in Chapter 3 (section 3.4.2.2). The inherent safety features of M-44's and LPC's that preclude or minimize hazards to mammals and plants are described in Appendix B and in a formal risk assessment in the USDA (1997revised, Appendix P). Those measures and characteristics should assure there would be no jeopardy to T&E species or adverse impacts on mammalian or non-T&E bird scavengers from the proposed action. None of the other damage management methods described in the proposed action alternative pose any adverse impacts to nontarget or T&E species.

Table 4-3. Wildlife killed or released during the Virginia Cooperative Coyote Damage Control Program conducted by the Wildlife Service program in Fiscal Year 1999 (October 1, 1998 through September 30, 1999) compared to target wildlife killed by hunters during legal hunting seasons during 1998-1999.

<u>Species</u>	<u>Killed by WS</u>	<u>Released by WS</u>	<u>Killed by hunters</u>
black bear	0	1	1,515
bobcat	6	2	4,004
deer	7	0	284,611
fox, grey	31	4	28,461
fox, red	73	0	17,315
opossum	34	3	n/a
raccoon	57	2	96,421
ravens	3	0	no hunting season
skunk, striped	2	0	n/a
vulture, black	1	0	no hunting season
woodchucks	20	0	n/a

#### **4.1.2.2 Alternative 2 - Nonlethal VCCDCP Only By WS**

Under this alternative, WS' take of nontarget animals would be less than the proposed action because no lethal damage management would be taken by WS. On the other hand, entities whose coyote, dog, or red fox livestock predation problems were not effectively resolved by nonlethal methods and recommendations, would likely resort to other lethal means such as use of shooting, trapping, and snaring by private persons or illegal use of toxicants. This could result in less experienced persons implementing control methods and could lead to greater take of nontarget wildlife than the proposed action. For example, trapping or snaring by persons not using pan-tension devices nor proficient at mammal sign identification could lead to killing more deer, fox, raccoon, and other animals than the proposed action. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of toxicants which could lead to unknown impacts on local nontarget species populations, including T&E species. Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

#### **4.1.2.3 Alternative 3 - Technical Assistance Only**

Alternative 3 would not allow any WS direct operational VCCDCP activities in the area. There would be no impact on nontarget or T&E species by WS activities from this alternative. Technical assistance or self-help information would be provided at the request of producers and others. Although technical support could lead to more selective use of lethal methods by private parties than what would occur under Alternative 2, private efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods leading to greater risks to nontarget wildlife than the proposed action. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of toxicants which could lead to unknown impacts on local nontarget species populations, including T&E species. These impacts would be similar to but probably less than Alternative 2. Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by private individuals. Adverse impacts under this alternative would therefore likely be greater than the proposed action, the same as Alternative 2, and slightly less than Alternative 4.

#### **4.1.2.4 Alternative 4 - Lethal VCCDCP Only By WS**

Under this alternative, only lethal VCCDCP activities would be recommended and implemented by WS to resolve coyote and red fox damage in all situations. WS would not recommended or use any nonlethal VCCDCP activities to reduce coyote, dog, or red fox damage within Virginia. WS' take of non-target animals would not differ substantially from the current program described in section 4.1.2.1. Although technical assistance, similar to Alternative 3, might lead to more selective use of lethal methods by private entities than that which might occur under Alternative 2, private efforts to reduce or prevent depredations could still result in less experienced persons implementing methods leading to greater risk to non-target wildlife than under the proposed action.

#### **4.1.2.5 Alternative 5 - No Federal WS VCCDCP**

Alternative 5 would not allow any WS VCCDCP in Virginia. There would be no impact on non-target or T&E species by WS activities from this alternative. However, private efforts to reduce or prevent depredations could increase which could result in less experienced persons implementing control methods and could lead to greater risks to non-target wildlife than under the proposed action. For example, shooting, trapping, and snaring by persons not proficient at mammal identification could lead to killing of non-target mammals. It is hypothetically possible that frustration caused by the inability to reduce losses

could lead to illegal use of toxicants which could impact local non-target species populations, including some T&E species. Hazards to raptors, including bald eagles, could therefore be greater under this alternative if toxicants that are less selective or that cause secondary poisoning are used by frustrated private individuals.

#### 4.1.3 Effects on dogs

##### 4.1.3.1 Alternative 1 - Continue the Current Federal VCCDCP/Integrated Wildlife Damage Management (The No Action/Proposed Action)

Under this Alternative, WS would not have an adverse affect on dogs (Table 4-4). WS does target and kill dogs to protect livestock in cooperation with local animal control officers. Unfortunately, some dog owners fail to restrain their dogs or follow local leash law ordinances which puts these dogs at risk. Some dogs are put at risk because a few hunters fail to get landowner permission and they trespass unaware of the damage management equipment their dogs may encounter. Take of dogs is likely less under this Alternative than alternative 2, 3, or 5, and the same as alternative 4.

Table 4-4. Take of dogs by Wildlife Services (WS) in fiscal year 1999 (October 1, 1998 through September 30, 1999) and dogs euthanized by local animal control and humane organizations in 1999.

<u>Species</u>	<u>Killed by WS</u>	<u>Released by WS</u>	<u>Euthanized by local government or humane organizations</u>
dogs	23	15	67,300

M-44's. The M-44 (sodium cyanide) is the primary lethal chemical VCCDCP method that would be used under the current program alternative. There has been some concern expressed by a few members of the public that risks to dogs is high.

The Virginia WS program used 2.3 lbs. of sodium cyanide for VCCDCP activities in FY1999. Therefore, actual use of this chemical by WS in Virginia is extremely low. This chemical has been extensively researched and evaluated for registration with EPA to reduce canine predation on livestock and T&E species. Appendix B provides more detailed information on this chemical and its use in VCCDCP. Factors that reduce risk to non-target dogs from use of this chemical are:

- follow M-44 label directions including the 26 use restrictions required by EPA and directions in the Predator Management Training Manual (Lowney 1996).
- WS personnel in Virginia are certified restricted-use pesticide applicators who must take a written exam administered by VDACS before being certified, and then must receive training before being certified as a M-44 applicator.
- the maximum application rates are extremely low (less than 12 grams per square mile) (EPA 1999).
- M-44's are only used within fenced pastures, fields, and wooded areas typically grazed by livestock.



- Warning signs are posted at entryways of the farm and within 25 feet of each M-44 unit.
- livestock producers are asked to inform their neighbors and hunters of VCCDCP activity.
- M-44's are not placed in the field from September 1 through January 7.

M-44s are only used within fenced pastures or fenced pastures where steep mountains form the fourth fence as the back side of the pasture and acts as a natural barrier. Most hunting dogs would not be at risk. The common types of fencing used on Virginia livestock pastures include: woven wire, barbed wire, high tensile wire, high tensile electric wire, and temporary electric (single or multiple strand wire). Certain fence types may reduce risk depending on the hounds being used and the quarry. However, no fence is 100% coyote proof and therefore may not be dog proof. Certain woven wire fences provide a substantial barrier to dogs.

The VCCDCP has killed 45 dogs with M-44s (FY96-FY01). Thirty-one of these dogs were non-target dogs. Of the 31 non-target dogs killed by M-44s only 7 have been known to be work dogs or free-roaming pets, or hunting dogs. In 5 cases the dog owners knew of the risks but either forgot, ignored the warnings, or the dog ignored warnings from the dog owner. In all thirty-one cases the dogs were killed in livestock pastures which means some of these dogs could have been chasing or about to kill or wound livestock.

The above analysis indicates that non-target dog risks from M-44 use would be very low under any alternative.

#### Livestock Protection Collars (LPC) (Sodium fluoroacetate).

Sodium fluoroacetate (Compound 1080) is another chemical method that might be used by WS in VCCDCP. Appendix B provides more detailed information on this chemical.

The Livestock Protection Collar (LPC) consists of a rubber collar with two rubber reservoirs, each of which contains 15 milliliters of a 1-percent solution of sodium fluoroacetate. The LPC has Velcro straps for attachment around the neck of a sheep or goat with the reservoirs positioned just behind the jaw. Two sizes of collars are available to accommodate various size livestock.

Coyotes typically attack sheep and goats by biting them on the throat and crushing the larynx, causing suffocation. Coyotes that attack collared sheep generally puncture the collar (in 75% or more of attacks) with their teeth and receive a lethal oral dose of toxicant. There has been limited use of sodium fluoroacetate in the Virginia program over the 4-year period of FY 1997-1999 amounting to 1830 milliliters from LPC's punctured by coyotes, torn, or lost. Appendix B provides more detailed information on this chemical and its use in VCCDCP.

Some dogs, especially work dogs, may be at risk of primary poisoning if a dog feeds upon 1080 contaminated wool or other material around sheep or lamb carcasses, but there is little danger to dogs that feed on only flesh (Burns and Connolly 1995). Dogs that feed upon a coyote carcass killed by Compound 1080 are not at risk (Burns et. al. 1986). Dogs feeding on contaminated wool is unlikely to occur because LPC'd livestock are monitored closely and disposed of as quickly as possible. Other measures taken to reduce risks to dogs are as follows:

- The toxicant is contained within rubber bladders worn by livestock which makes it unlikely that non-problem dogs will come into contact with LPC's.

- Secondary hazard studies with mammals and birds have shown that there is virtually no hazard of secondary poisoning (Burns et. al.1986, Connolly 1990).
- Warning signs are placed at the entrance of farms where sheep or goats collared with LPC's are ranging within fenced pastures. There is a warning label attached to the LPC informing a person about the toxic nature of the contents.
- WS personnel are Virginia certified restricted-use pesticide applicators who must take an additional written exam administered by VDACS before being certified as a LPC applicator.
- There is a yellow dye mixed with the sodium fluoroacetate in the LPC which serves as a warning that the LPC has been punctured and precautionary measures need to be taken.
- WS personnel follow label instructions and directions in the Predator Management Training Manual (Lowney 1996).

LPC'd livestock are monitored closely and any livestock carcasses are disposed of as quickly as possible further reducing risks to dogs. The VCCDCP has killed one farmer's work dog because the farmer failed to keep his dog restrained until a lamb carcass with a punctured LPC had been disposed of. The dog was observed licking the area on the lamb's neck where the compound 1080 had leaked and was absorbed by the wool.

The above analysis indicates that non-target dog risks from sodium fluoroacetate use would be low under any alternative.

### Snares

Neck snares are another VCCDCP method that would be used under the current program alternative. There has been some concern expressed by a few members of the public that risks to dogs is high.

Snares pose virtually no risks to dogs that are leash broke. Leash broke dogs, when captured by a snare, generally sit patiently for someone to free them. Unfortunately, some dogs not leash broke may be at risk. Measures taken to reduce risk to non-target dogs include:

- Snares are only set in fences and in gates where coyotes or fox commonly enter pastures.
- Livestock producers are asked to inform their neighbors and hunters of VCCDCP activity.
- Farm entryways are posted with warning signs.
- Snares are checked every 24 hours.

No non-target hunting dogs have been killed by a VCCDCP neck snare. Two target coon hounds were shot by the farmer after being captured with neck snares. Fifty-five dogs have been captured using VCCDCP neck snares (FY94-FY01) 24 of these dogs were non-targets. Of the 55 dogs, 20 dogs were released and 35 dogs were either killed by the snare or shot (Table 4-5).

### Leghold traps

Leghold traps may pose small risks of injury to small dogs. WS uses leghold traps designed to reduce non-target captures or injury by using traps with pan tension devices, offset jaws, laminated jaws, shock-

absorbing springs, or padded jaws to further reduce risk of injury to non-target dogs. Eighty-one dogs have been captured using VCCDCP leghold traps (FY93-FY01). None of the dogs had visible foot injuries. Of the 81 dogs, 61 dogs were freed or released to animal control, and 20 dogs were killed (Table 4-5). Some dogs were killed by the farmer or other persons.

Table 4-5. Effects on target and non-target dogs captured in the Virginia Cooperative Coyote Damage Control Program by method and outcome.

<u>Year</u>	<u>Number of dogs captured by method</u>	<u>target or non-target</u>	<u>total killed</u>	<u>total freed</u>
1991	0		0	0
1992	1-snare	non-target	0	1
1993	2-leghold	non-targets	1	1
1994	1-neck snare	target	1	0
	9-leghold	1 target:8 non-target	1	8
1995	1-shooting	target	1	0
	7-neck snare	targets	6	1
	5-leghold	non-targets	0	5
1996	1-M44	target	1	0
	5-neck snare	non-targets	0	5
	13-leghold	1 target:12 non-target	4	9
1997	8-M44	non-targets	8	0
	1-shooting	target	1	0
	9-neck snare	3 target: 6 non-target	8	1
	6-leghold	2 target: 4 non-target	2	4
1998	1-LPC	non-targets	1	0
	10-M44	non-targets	10	0
	3-neck snare	non-targets	1	2
	9-leghold	4 targets:5 non-target	4	5
1999	12-M44	3 target: 9 non-target	12	0
	2-shooting	targets	2	0
	10-neck snare	6 target: 4 non-target	6	4
	14-leghold	8 target: 6 non-target	3	11
2000	9-M44	6 target: 3 non-target	9	0
	1-shooting	target	1	0
	14-neck snare	8 target: 6 non-target	8	6
	10-leghold	5 target: 5 non-target	3	7
2001	5-M44	4 target: 1 non-target	5	0
	1-shooting	target	1	0
	6-neck snare	6 target	5	1
	13-leghold	2 target:11 non-target	2	11

#### **4.1.3.2 Alternative 2 - Nonlethal VCCDCP Only By WS**

WS would have no effect on dogs because WS is conducting no lethal damage management. If livestock producers use guard dogs recommended by WS, then some hunting dogs may be killed by guard dogs if the hunting dogs enter pastures protected by guard dogs. Guard dogs are generally considered a nonlethal method. Furthermore, local animal control will receive no lethal control assistance from WS. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of toxicants which could adversely affect dogs locally.

#### **4.1.3.3 Alternative 3 - Technical Assistance Only**

WS would have no effect on dogs because WS would not conduct any direct damage management. If livestock producers use guard dogs recommended by WS, then some hunting dogs may be killed by guard dogs if the hunting dogs enter pastures protected by guard dogs. Furthermore, local animal control will receive only technical assistance from WS when they may actually need WS expertise in capturing some dogs. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of toxicants which could adversely affect dogs locally.

#### **4.1.3.4 Alternative 4 - Lethal VCCDCP Only by WS**

Under this Alternative, WS would not have any adverse affects on dogs (Table 4-4). WS does kill dogs to protect livestock. Unfortunately, some dog owners fail to restrain their dogs or follow local leash law ordinances which puts these dogs at risk. Some dogs are put at risk because a few hunters fail to get landowner permission and they trespass unaware of the damage management methods their dogs may encounter. Take of dogs is likely less under this Alternative than alternative 2, 3, or 5, and the same as alternative 1.

#### **4.1.3.5 Alternative 5 - No Federal WS VCCDCP**

WS would have no effect on dogs because WS is not providing any assistance. Lethal and nonlethal methods used by livestock producers may have greater adverse affects on dogs. Local animal control will receive no assistance from WS and this could take longer to solve some dog depredation problems on livestock. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of toxicants which could adversely impact dogs locally.

### **4.1.4 Effects on Human Health and Safety**

#### **4.1.4.1 Safety and Efficacy of Chemical Damage Management Methods By Alternative**

##### **4.1.4.1.1 Alternative 1 - Continue the Current Federal VCCDCP /Integrated Wildlife Damage Management (No Action/Proposed Action)**

M-44's. The M-44 (sodium cyanide) is the primary lethal chemical VCCDCP method that would be used under the current program alternative. There has been some concern expressed by a few members of the public that unknown risks to human health may exist from M-44's.

The Virginia WS program used 2.3 lbs. of sodium cyanide for VCCDCP activities in FY1999. Therefore, actual use of this chemical by WS in Virginia is extremely low. This chemical has been extensively researched and evaluated for registration with EPA to reduce canine predation on livestock and T&E species. No WS employee has ever been killed by either a M-44's or a coyote getter through 50 years of WS use. According to the EPA, out of greater than 400,000 recorded

exposures or deaths to all sorts of other animal toxicants, there have been no M-44 exposures to the public. Appendix B provides more detailed information on this chemical and its use in VCCDCP. Factors that virtually eliminate any risk of public health or safety problems from use of this chemical are:

- follow M-44 label directions including the 26 use restrictions required by EPA and directions in the Predator Management Training Manual (Lowney 1996).
- all employees using M-44's carry amyl nitrate antidote kits
- poison control centers have been notified about use of sodium cyanide in Virginia
- sodium cyanide rapidly breaks down when exposed to the environment.
- sodium cyanide rapidly breaks down when exposed to the environment so persons handling exposed pets or dead animals would receive no exposure.
- sodium cyanide registered by WS has an orange marking dye which may indicate exposure of sodium cyanide if found on clothing, skin, or fur.
- the maximum application rates are extremely low (less than 12 grams per square mile) (EPA 1999).
- a human would need to orally ingest sodium cyanide from the M-44 to die. This would mean biting down on a M-44 embedded in the ground, the head of which is baited with rancid meat paste. The person would then have to pull the M-44 with their teeth to have any chance of receiving this chemical or its metabolites into his/her system. This is highly unlikely to occur.
- M-44's are only used within fenced pastures, fields, and wooded areas typically grazed by livestock
- Warning signs are posted at entryways of the farm and within 25 feet of each M-44 unit.
- WS personnel are Virginia certified restricted-use pesticide applicators.

The above analysis indicates that human health risks from M-44 use would be virtually nonexistent under any alternative.

Livestock Protection Collars (LPC) (Sodium fluoroacetate). Sodium fluoroacetate is another chemical method that might be used by WS in VCCDCP. Appendix B provides more detailed information on this chemical.

The Livestock Protection Collar (LPC) consists of a rubber collar with two rubber reservoirs, each of which contains 15 milliliters of a 1-percent solution of sodium fluoroacetate. The LPC has Velcro straps for attachment around the neck of a sheep or goat with the reservoirs positioned just behind the jaw. Two sizes of collars are available to accommodate various size livestock.

Coyotes typically attack sheep and goats by biting them on the throat and crushing the larynx, causing suffocation. Coyotes that attack collared sheep generally puncture the collar (in 75% or more of attacks) with their teeth and receive a lethal oral dose of toxicant. There has been limited use of

sodium fluoroacetate in the Virginia program over the 4-year period of FY 1997-1999 amounting to 1830 milliliters from LPC's punctured by coyotes, torn, or lost. Appendix B provides more detailed information on this chemical and its use in VCCDCP. In addition to this factor, other factors that virtually eliminate health risks to members of the public from use of this product as a predicide are:

- The toxicant is contained within rubber bladders worn by livestock which makes it unlikely the public will come into contact with LPC's.
- a human would need to ingest liquid toxicant from one of the rubber bladders to have any chance of receiving the chemical into his/her system. This is highly unlikely to occur. Furthermore, secondary hazard studies with mammals and birds have shown that there is virtually no hazard of secondary poisoning.
- Warning signs are placed at the entrance of farms where sheep or goats collared with LPC's are ranging within fenced pastures. There is a warning label attached to the LPC informing a person about the toxic nature of the contents.
- WS personnel are Virginia certified restricted-use pesticide applicators who must take an additional written exam administered by VDACS before being certified as a LPC applicator.
- There is a yellow dye mixed with the sodium fluoroacetate in the LPC which serves as a warning that the LPC has been punctured and precautionary measures such as wearing rubber gloves need to be taken.
- WS personnel follow label instructions and directions in the Predator Management Training Manual (Lowney 1996).

The above analysis indicates that human health risks from sodium fluoroacetate use would be virtually nonexistent under any alternative.

Other VCCDCP Chemicals. Other lethal VCCDCP chemicals that might be used or recommended by WS if they become registered for VCCDCP would include the Large Gas Cartridge (Sodium nitrate). The Large Gas Cartridge is burned to create the carbon monoxide needed to euthanize animals. Applicators must exercise caution to avoid burns to the skin or surrounding vegetation. Appendix B provides more detailed information on this chemical and its current use in predator damage management. Such chemicals must undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before they would be registered by EPA.

Any operational use of chemical repellents would be in accordance with labeling requirements under FIFRA and state pesticide laws and regulations which are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions are a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on human health.

Based on a thorough Risk Assessment, APHIS concluded that, when WS program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997).

#### **4.1.4.1.2 Alternative 2 - Nonlethal VCCDCP Only By WS**

Alternative 2 would not allow for any lethal methods to be used or recommended by WS. There are

no nonlethal chemicals available for use under this alternative. Excessive cost or ineffectiveness of nonlethal techniques could result in some entities rejecting WS' assistance and resorting to other means of damage management. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and potentially leading to greater risks to human health and safety than the current program. Hazards to humans and pets could be greater under this alternative if other chemicals that are less selective or that cause secondary poisoning are used. It is hypothetically possible that frustration caused by the inability to alleviate coyote, dog, or red fox damage could lead to illegal use of certain toxicants that, unlike WS' controlled use of M-44's and LPC, could pose secondary poisoning hazards to pets and to mammalian and avian scavengers. Some chemicals that could be used illegally would present greater risks of adverse effects on humans than those used under the current program alternative.

#### **4.1.4.1.3 Alternative 3 - Technical Assistance Only**

Alternative 3 would not allow any direct operational VCCDCP assistance by WS in Virginia. WS would only provide advice and, in some cases, equipment or materials (i.e., by loan or sale) to other persons who would then conduct their own damage management actions. Concerns about human health risks from WS' use of chemical methods would be alleviated because no such use would occur. M-44's and LPC's are only registered for use by WS personnel and would not be available for use by private individuals. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and leading to a greater risk than Alternative 1 (No Action/Proposed Action) and Alternative 4. However, because some of these private parties would be receiving advice and instruction from WS, concerns about human health risks from gas cartridges should be less than under Alternative 5. Use the Large Gas Cartridge in accordance with label requirements should avoid any hazard to members of the public. Hazards to humans and pets could be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used. It is hypothetically possible that frustration caused by the inability to alleviate coyote, dogs, and red fox predation on livestock could lead to illegal use of toxicants that, unlike WS' controlled use of M-44's and LPC's, could pose secondary poisoning hazards to pets and mammalian and avian scavengers. Some chemicals that could be used illegally would present greater risks or adverse effects to humans than those used under the current program alternative.

#### **4.1.4.1.4 Alternative 4 - Lethal VCCDCP Only By WS**

Under this alternative, only lethal VCCDCP methods would be implemented to resolve coyote, dog, and red fox predation on livestock in all situations. WS would not recommended or use any nonlethal VCCDCP methods. WS' use of chemical VCCDCP methods would not differ substantially from the current program. Although technical support, similar to Alternative 3, might lead to more selective use of lethal damage management methods by private parties than that under Alternative 2. Private efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods leading to a greater human health risk than under the proposed action. Hazards to humans and pets could be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used. It is possible that, similar to but probably less than under Alternative 2, frustration caused by the inability to reduce losses to acceptable levels could lead to illegal use of toxicants that could pose hazards to pets and to mammalian and avian scavengers. Some chemicals that could be used illegally would present greater risks of adverse effects on humans than those used under the current program alternative.

#### **4.1.4.1.5 Alternative 5 - No Federal WS VCCDCP**

Alternative 5 would not allow any WS VCCDCP in Virginia. Concerns about human health risks from WS' use of chemical VCCDCP methods would be alleviated because no such use would occur. M-44's and LPC's are only registered for use by WS personnel and would not be available for private individual use. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and potentially leading to greater risk to human health and safety than the current program. However, use of the gas cartridge by private individuals in accordance with label requirements should avoid any hazard to members of the public. However, hazards to humans and pets could be greater under this alternative if other chemicals that are less selective or that cause secondary poisoning are used. It is possible that frustration caused by the inability to alleviate coyote, dog, or red fox damage could lead to illegal use of certain toxicants that, unlike WS' controlled use of M-44's and LPC's, could pose secondary poisoning hazards to pets and to mammalian and avian scavengers. Some chemicals that could be used illegally would present greater risks of adverse effects on humans than those used under the current program alternative.

#### **4.1.4.2 Impacts on Human Safety of Nonchemical VCCDCP Methods By Alternative**

##### **4.1.4.2.1 Alternative 1 - Continue the Current Federal VCCDCP /Integrated Wildlife Damage Management (No Action/Proposed Action)**

Nonchemical VCCDCP methods that might raise safety concerns include shooting with firearms, leg-hold traps, and guard dogs. Firearms are only used by WS personnel who are experienced in handling and using them. WS personnel receive safety training on a periodic basis to keep them aware of safety concerns. The VA WS program has had no accidents involving the use of firearms or leg-hold traps in which a member of the public or WS was harmed. A formal risk assessment of WS' operational management methods found that risks to human safety were low (USDA 1997revised, Appendix P). Therefore, there would be no adverse affects on human safety from WS' use of these methods. Technical assistance would be provided to private individuals in the safe and proper use of VCCDCP damage management methods as requested. This would likely reduce human safety risks somewhat when WS' advice is utilized, but some VCCDCP activities would continue without WS' technical assistance resulting in an increase risk to human safety. Some guard dogs are aggressive towards people and livestock producers bear responsibility and liability for the use of this method.

##### **4.1.4.2.2 Alternative 2 - Nonlethal VCCDCP Only by WS**

Under this alternative, WS would not use firearms or leg-hold traps for lethal damage management during VCCDCP. Risks to human safety from WS' use of firearms and leg-hold traps would be similar to those described under Alternative 1. Technical advise would be provided to private individuals in the safe and proper use of nonlethal control devices when requested. However, increased use of firearms, both as a lethal and a nonlethal VCCDCP device, by less experienced and trained private individuals, would probably occur due to the sometimes ineffectiveness of nonlethal methods when they are used alone.

##### **4.1.4.2.3 Alternative 3 - Technical Assistance Only**

Under this alternative, WS would not engage in direct operational use of any nonchemical VCCDCP method. Risks to human safety from WS' use of firearms and other equipment would be lower than the current program, but VA WS' current VCCDCP program has an excellent safety record in which no accidents involving the use of these devices have occurred. Technical assistance would be provided to private individuals in the safe and proper use of VCCDCP control devices. However, increased use of firearms, both as a lethal and a nonlethal VCCDCP device, by less experienced and



trained private individuals would probably occur without WS operational assistance, which would likely increase human safety risks. Impacts to human safety would be similar to Alternative 2 but to a lesser extent than Alternative 5, because some of these private parties would receive advice and instruction from WS.

#### **4.1.4.2.4 Alternative 4 - Lethal VCCDCP Only By WS**

Under this alternative, only lethal VCCDCP methods would be implemented to resolve coyote, dog, and fox predation on livestock in all situations. WS would not recommended or use any nonlethal VCCDCP methods. WS' use of nonchemical lethal VCCDCP methods, the use of firearms, leg-hold traps, and snares, would not differ substantially from the current program described in Alternative 1. Although technical assistance, similar to Alternative 3, could lead to more selective use of lethal control methods by private parties than that under Alternative 2, private efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods. Thus, resulting in risks to human safety similar to Alternative 2 and 3, but to a lesser extent than Alternative 5.

#### **4.1.4.2.5 Alternative 5 - No Federal WS VCCDCP**

Under this alternative, WS would not engage in or recommend use of any VCCDCP methods. Risks to human safety from WS' use of firearms and leg-hold traps would be alleviated because no such use would occur. However, increased use of firearms by less experienced and trained private individuals would probably occur without WS assistance. WS would not provide assistance to private individuals in the safe and proper use of VCCDCP control devices.

### **4.1.4.3 Impacts on Human Safety from Not Conducting the VCCDCP to Reduce Risk from Coyotes Which Attack Children and Adults**

#### **4.1.4.3.1 Alternative 1 - Continue the Current Federal VCCDCP /Integrated Wildlife Damage Management (No Action/Proposed Action)**

While the funding and legislative direction of the VCCDCP is to protect livestock from predation by coyotes, WS would be available to respond to a request for capture and removal of a coyote or fox that is threatening or has attacked a human. The likelihood of a coyote attack on humans is very low, but has occurred in other states and Virginia (Baker and Timm 1998, Report on coyote attack in Sandwich, Massachusetts from S. Langolois to R. Deblinger, September 4, 1998, Howard 1997). WS recognizes no nonlethal methods are appropriate for this situation because the coyote obviously has no fear or has habituated to humans. The analysis for Alternative 1 and 4 are the same because WS would be available for these emergencies and the affect is beneficial, as WS would reduce risk to human safety.

#### **4.1.4.3.2 Alternative 2 - Nonlethal VCCDCP Only By WS**

Under this alternative, WS would be unavailable to respond to a request from Virginia for capture and removal of a coyote or fox that is threatening or has attacked a human. The VDGIF and local animal control may have the ability and availability to respond to a request to protect human safety. Whereas, WS would be prohibited from implementing lethal methods under this Alternative, other government agencies and individuals could implement lethal methods. WS would be unable to loan lethal equipment or provide lethal technical advice in this situation. WS recognizes no nonlethal methods are appropriate for this situation because the coyote obviously has no fear or has habituated to humans. The negative affects of not protecting human safety under this alternative would be greater than Alternative 1 and 4, slightly more than Alternative 3, and the same as Alternative 5.

#### **4.1.4.3.3 Alternative 3 - Technical Assistance Only**

Under this alternative, WS would not implement the operational use of any VCCDCP methods. Only technical assistance would be recommended to alleviate threats or attacks on humans in all situations. While the funding and legislative direction of the VCCDCP is to protect livestock, WS would be available to provide technical assistance to a request from Virginia for capture and removal of a coyote or fox that is threatening or has attacked a human. The VDGIF and local animal control may have the ability and availability to respond to this request to protect human safety. Whereas, WS would be prohibited from implementing operation assistance under this Alternative, other government agencies and individuals could capture and remove the coyote or fox. WS would be able to loan equipment. WS recognizes that nonlethal methods would not be appropriate for this situation because the coyote obviously has no fear or has habituated to humans. The negative affects of providing technical assistance to protect human safety under this alternative would be greater than Alternative 1 and 4, slightly less than Alternative 2 and 5.

Individuals requesting VCCDCP for human health and safety concerns would either (1) not take any action which means the risk of human health and safety problems would continue or would increase in each situation, (2) undertake lethal VCCDCP methods themselves, or (3) hire animal control agents to conduct VCCDCP activities. Because M-44's would not be available for use by non-WS personnel, it may be more time consuming to remove the offending coyote or fox. Under this alternative, a threat to human safety could increase if private individuals were unable to achieve effective removal of offending coyotes or fox with technical assistance alone, or if they were unable to hire other entities to protect human safety concerns. Overall negative affects to human safety would likely be greater than the proposed action.

#### **4.1.4.3.4 Alternative 4 - Lethal VCCDCP Only By WS**

While the funding and legislative direction of the VCCDCP is to protect livestock from predation by coyotes, dogs, and fox, WS would be available to respond to a request from Virginia for capture and removal of a coyote or fox that is threatening or has attacked a human. The likelihood of a coyote attack on humans is very low, but has occurred in other states and Virginia. WS recognizes that nonlethal methods are not appropriate for this situation because the coyote has no fear or has habituated to humans. The affects of Alternative 4 are positive and the same as Alternative 1.

#### **4.1.4.3.5 Alternative 5 - No Federal WS VCCDCP**

With no WS assistance, private individuals and state and local government officials would be responsible for developing and implementing their own program to protect human safety. Affects on human safety would likely be greater under this alternative than the proposed action, because these parties would either (1) not take any action which means the risk of human health and safety problems would continue or would increase in each situation, (2) undertake lethal control methods, or (4) hire animal control agents to conduct activities to protect human safety. A primary difference between this alternative and the proposed action is that M-44s and the expertise and experience of WS would not be available. Under this alternative, human health problems could increase if private individuals were unable to find and implement effective means of removing a threatening coyote or fox.

### **4.1.5 Impacts to Stakeholders, Including Aesthetics**

#### **4.1.5.1 Effects on Human Affectionate-Bonds with Individual Animals and on Aesthetic Values of Wild Canids**

#### **4.1.5.1.1 Alternative 1 - Continue the Current Federal VCCDCP /Integrated Wildlife Damage Management (No Action/Proposed Action)**

Those rare people who view or feed individual coyotes or fox and have affectionate bonds with the animal may be disturbed by removal of such animals under the current program. WS is aware of such concerns and has taken it into consideration in some cases to mitigate the concerns and disturbance.

Some people have expressed opposition to the killing of any coyotes or red fox during VCCDCP activities. Under the current program, some lethal damage management of coyotes and red fox would continue and WS would continue to mitigate (i.e., use nonlethal methods) as much as practical with these persons. Many persons who voice opposition have no direct connection to the damage or opportunity to view or enjoy the particular coyotes or red fox that would be killed by WS' lethal damage management. Lethal damage management would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would therefore continue to remain available for viewing or listening by persons with that interest.

Some people do not believe that coyotes or red fox should be harassed or killed to stop or reduce damage problems and that predation is part of doing business as a livestock producer. People who like to view or listen to these species can still do so on many state wildlife management areas, state parks, national forests, national wildlife refuges, county parks as well as numerous private properties in Virginia away from the damage management areas.

#### **4.1.5.1.2 Alternative 2 - Nonlethal VCCDCP Only By WS**

Under this alternative, WS would not conduct any lethal VCCDCP, therefore WS would not have any effects on affectionate bonds towards coyotes and red fox. However, while WS may not be killing coyotes or red fox, livestock producers or their agents could kill these animals. Therefore, impacts on human affectionate bonds would still occur for some people. Some people who oppose lethal damage management by government agencies are tolerant of government involvement in nonlethal wildlife damage management and would favor this alternative. The impacts would be similar to the current program.

#### **4.1.5.1.3 Alternative 3 - Technical Assistance Only**

Under this alternative, WS would not conduct any direct operational VCCDCP but would provide technical assistance or self-help advice to persons requesting assistance with coyote or red fox predation. Some people who oppose direct operational assistance in wildlife damage management by the government but favor government technical assistance would favor this alternative. Persons who have developed affectionate bonds with individual wild canids would not be affected by WS' activities because the individual canids would not be killed by WS. However, other entities would likely conduct similar VCCDCP activities as those that would no longer be conducted by WS which means the impacts would be similar to the current program.

#### **4.1.5.1.4 Alternative 4 - Lethal VCCDCP Only By WS**

Under this alternative, only lethal VCCDCP activities would be implemented or recommended. People that have expressed opposition to the killing of any wild canids during VCCDCP activities would likely oppose this alternative. However, other entities would likely conduct similar VCCDCP activities as those that would be conducted by WS, which means the impacts would then be similar to the current program.

#### **4.1.5.1.5 Alternative 5 - No Federal WS VCCDCP**

Under this alternative, WS would not conduct any lethal or nonlethal VCCDCP activities. Some people who oppose any government involvement in wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild canids would not be affected by WS' activities under this alternative. However, other entities would likely conduct similar VCCDCP activities as those that would no longer be conducted by WS, resulting in impacts that would be similar to the current program.

#### **4.1.5.2 Effects on Aesthetic Values of Coyotes**

##### **4.1.5.2.1 Alternative 1 - Continue the Current Federal VCCDCP/Integrated Wildlife Damage Management (No Action/Proposed Action)**

The effects would be the same as in 4.1.5.1.1.

##### **4.1.5.2.2 Alternative 2 - Nonlethal VCCDCP Only By WS**

The effects would be the same as in 4.1.5.1.2.

##### **4.1.5.2.3 Alternative 3 - Technical Assistance Only**

The effects would be the same as in 4.1.5.1.3.

##### **4.1.5.2.4 Alternative 4 - Lethal VCCDCP Only By WS**

The effects would be the same as in 4.1.5.1.4.

##### **4.1.5.2.5 Alternative 5 - No Federal WS VCCDCP**

The effects would be the same as in 4.1.5.1.5.

Table 4-6 summarizes the expected impacts of each of the alternatives on each of the issues.

## **4.2 Cumulative Impacts**

No significant cumulative environmental impacts are expected from any of the five alternatives. Under the Proposed Action and Alternative 4, the lethal removal of coyotes, dogs, and red foxes would not have a significant impact on overall coyote or red fox populations in Virginia, but some local reductions may occur. Both alternatives are supported by the VDGIF, which is the agency with responsibility for managing coyotes and red fox in Virginia. This is also supported by VDACS, which is the agency with responsibility for managing coyote predation in Virginia. No risk to public safety is expected when WS' activities are provided and accepted by requesting individuals in Alternatives 1, 2, 3, and 4, since only trained and experienced wildlife biologists and wildlife specialists would conduct and recommend VCCDCP activities. There is a slight increased risk to public safety when VCCDCP activities are conducted by persons that reject WS assistance and recommendations in Alternatives 1, 2, 3, and 4, and when no WS assistance is provided in Alternative 5. In all five alternatives, however, it would not be to the extent that the impacts would be significant. Although some persons would likely oppose WS' participation in VCCDCP activities to protect livestock from coyote or red fox predation on livestock, the analysis in this EA indicates that WS Integrated VCCDCP program would not result in cumulative adverse impacts on the quality of the human environment.

**Table 4-6. Relative Comparison of Anticipated Impacts From Alternatives.**

Issues/Impacts	Alt. 1 Current Program (Proposed Action / No Action)	Alt. 2 Nonlethal Only	Alt. 3 Technical Assistance (TA) Only	Alt. 4 Lethal Only	Alt. 5 No Federal Program
Target Species Impacts (coyote and red fox)	Low impact - reduction in local coyote and red fox numbers would not adversely affect species population viability.	Low to no impact - reductions in local coyote or red fox numbers would not occur or would also not adversely affect species viability.	Low impact - reductions in local coyote or red fox numbers may occur but would not adversely affect species viability.	Low impact - reductions in local coyote or red fox numbers would occur but would not adversely affect species viability.	Low impact - reductions in local coyote or red fox numbers less likely w/o WS assistance, but would not adversely affect species viability.
Impacts to Non-target Wildlife Species including T&E species	Low impact - methods used by WS would be highly selective with low risk to non-target species and T&E populations	Low impact but greater than Alt. 1 - people with coyote, dog, or red fox problems may resort to less selective lethal methods, if they reject nonlethal methods.	Low impact but greater than Alt. 1, and people with coyote, dog, or red fox problems may resort to less selective lethal methods, but less likely with WS TA.	Low impact but similar as Alt. 1 - people with coyote, dog, or red fox problems may resort to less selective methods, if they reject recommended lethal methods, but less likely than Alt. 2	Low impact but greater than Alts. 1, 2, 3, or 4 - people with coyote, dog, or red fox problems may resort to less selective lethal methods w/o WS assistance.
Effects on dogs (non-target)	Low impact - lethal methods used are within fenced areas or allow the release of non-target dogs.	Low impact - guard dogs recommended by WS may kill dogs that enter pastures with livestock.	Low impact - greater impact than Alt. 1, 2, and 4 if people implement methods differently than recommended by WS or ignore WS recommendations.	Low impact - lethal methods used are within fenced areas or allow the release of non-target dogs.	Low impact - impacts may be greater than Alts. 1, 2, 3, and 4 if individual uses less selective method or misuses a pesticide or method.
Human Health and Safety - Risks of Adverse Effects from chemical Methods	Low risk - methods used by WS would be safe with no probable risk of human health or safety effects.	Low to no risk but slightly greater than Alt.1 - people with coyote, dog, or red fox problems may resort to illegal chemicals or methods that pose human/safety risks if they reject nonlethal methods.	Low risk but slightly greater than Alt.1 & 4, slightly less than Alt. 2 - people with coyote, dog, and red fox problems may resort to illegal lethal or chemical methods that pose human health/safety risks; less likely with WS TA.	Low risk but similar to Alt. 1, slightly less than Alt. 2 & 4, - people with coyote, dog, or red fox problems may resort to illegal lethal chemicals or methods that pose human/safety risks if they reject recommended lethal methods.	Low risk but greater than Alts. 1, 2, 3, or 4 - people with coyote, dog, or red fox problems may resort to illegal chemical or other methods that pose human/safety risks; most likely w/o WS direct or TA assistance.
Human Health and Safety - Risks of Adverse Effects from non-chemical methods	Low risk -WS employees receive extensive firearms training. There have been no injuries to employees or the public in Virginia.	Low to Moderate risk but greater than Alt. 1 - risks would increase where nonlethal methods would not resolve coyote, dog, or red fox problems and people resort to misuse of pesticides.	Higher risk than Alt. 1 & 4, but similar to Alt 2 - individuals may be able to resolve coyote, dog, or red fox problems with TA assistance, but may resort to misuse of pesticides if unable to stop predation.	Similar risk as Alt. 1, but less than Alt. 2 & 3, - if producers are unable to resolve coyote, dog, or red fox problems with lethal methods they implement.	Higher risk than Alts. 1, 2, 3, or 4 - persons with coyote, dog, or red fox problems might be able to achieve success, but less likely w/o WS direct operational or technical assistance
Human Health and Safety - attacks or threats on humans	Low or no impact - WS would be able to assist if requested.	Moderate to High risk - WS unable to assist with lethal methods. Other government agencies or individuals may assist.	Moderate risk - No WS operational work. WS could advise others and lend equipment.	Low or no impact - WS would be able to assist if requested.	Moderate to High risk - No WS involvement. Other government agencies or individuals may assist.

Aesthetic Enjoyment of Wild Canids	Low impact (at local level only) - WS VCCDCP does not adversely affect overall canid populations but there may be local population reductions.	Low impact- coyote or red fox numbers at damage sites would remain high or would increase, unless nonlethal recommendations were rejected and coyote or red fox numbers were reduced by non-WS personnel	Low impact (at local level) - coyote or red fox numbers at damage sites would remain high or would increase, unless TA recommendations are implemented successfully.	Low impact (at local level only) - WS VCCDCP does not adversely affect overall canid populations but there may be local population reductions.	Low impact - coyote or red fox numbers at damage sites would remain high or would increase, unless persons are successful in reducing canid numbers w/o WS direct operational or technical assistance.
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## **CHAPTER 5: LIST OF PREPARES AND PERSONS CONSULTED**

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## APPENDIX B

### COYOTE, DOG, AND RED FOX DAMAGE MANAGEMENT (VCCDCP) METHODS AVAILABLE FOR USE OR RECOMMENDATION BY THE VIRGINIA WILDLIFE SERVICES PROGRAM

#### NONCHEMICAL, NONLETHAL METHODS

**Producer-Implemented Methods.** These consist primarily of nonlethal preventive methods such as cultural methods and habitat modification. Cultural methods and other management techniques are implemented by the livestock producer. Livestock producers may be encouraged to use these methods, based on the level of risk, need, and professional judgement on their effectiveness and practicality. These methods include:

**Animal husbandry** practices include modifications in the level of care or attention given to livestock (depending on the age and size of the livestock). Animal husbandry practices include, but are not limited to, the use of:

**Guard animals** include the use of dogs, donkeys, and llamas. These animals can effectively reduce predator losses in some situations (Meadows and Knowlton 2000, Cavalcanti and Knowlton 1998, Green and Woodruff 1996). Guard dogs most frequently used in Virginia are Maremma and Great Pyrenees. Anatolian shepherds and Akbash breeds may also be encountered. Success in using guard dogs is highly dependent on proper breeding and bonding with the type of livestock the dog is to protect. Effective use of guard dogs depends on training, obedience, care, and feeding (Green and Woodruff 1996). The efficacy of guard dogs is affected by the amount of predation loss, size and topography of the pasture, acceptance of the dog by the livestock, training, compatibility with humans, and compatibility with other predator damage management methods. Guard dogs breeds mature at about 2 years of age and may begin protecting livestock at this age. Guard dogs have a effective working life of less than three years because of accidents, disease, and people misidentifying the guard dog as a threat to the livestock and they shoot the dog (Lorenz et al. 1986, Green 1989). Guard dogs may kill, injure, harass, or try to breed sheep and goats (Green 1983). The success of guard dogs in Virginia is highly variable with a few livestock producers claiming all coyote predation stopped and some livestock producers reporting no effectiveness at stopping predation. Most livestock producers report they believe there was a reduction in coyote predation.

Guard donkeys have been used to protect livestock with mixed results. The reported most effective guard donkey is a jenny with a foal. Guard donkeys are probably more effective at deterring dog predation than coyote predation.

Guard llamas have also been used with mixed success to protect livestock. Producers in Virginia believe guard llamas are better at defending livestock from dogs than coyotes. Llamas are typically aggressive toward dogs and appear to readily bond with sheep (Cavalcanti and Knowlton 1998). Llamas are able to reduce predation on sheep initially (Meadows and Knowlton 2000). Dogs and coyotes adapt to the protective nature llamas over time reducing their effectiveness (Meadows and Knowlton 2000).

**Herders** or shepherds stay with the flock day and night. This method historically was used with roving bands of sheep. It is rarely used in Virginia because sheep and goats are confined to fenced pastures.

**Shed lambing** is birthing lambs, kids (baby goats), or calves in buildings. Lambs may be born and kept in a building for the first one to two weeks of life. Cattle are rarely birthed in buildings because of cost, size,

and number of buildings which would be required. Goats are rarely birthed in buildings in Virginia. Birthing in buildings adds additional labor costs and raises disease concerns among livestock producers. While this may initially enhance survival of young animals, the predators get the young animals when they are turned out on pasture. Many times this method delays the inevitable predation of sheep and goats.

**Carcass removal** is burying or incinerating dead livestock to remove an attractant for coyotes, dogs, or fox.

**Pasture selection** is placing or moving sheep, goats, or cattle in pastures believed less likely to expose livestock to predation. Usually, moving livestock to pastures near human habitation is believed to expose livestock to fewer predators. Livestock producers eventually must move livestock to distant pastures to graze, however, they may wait until lambs, kids (goats), and calves are larger and older in the hope to reduce their vulnerability to predation.

**Habitat modification** is used whenever practical to attract or repel certain wildlife species or to separate livestock from predators. For example, WS may recommend that a producer clear brush from lambing or calving pastures to reduce available cover for predators.

**Animal behavior modification** refers to tactics that deter or repel predators and thus, reduce predation. Unfortunately, many of these techniques are only effective for a short time before wildlife habituate to them (Pfeifer and Goos 1982, Conover 1982). Devices used to modify behavior include:

**Predator-resistant fences** are woven wire or 9 or 11 strand electric fences. Woven wire fences generally are four-foot tall and may have a barb wire along the bottom of the fence to deter digging under by predators. Electric fences may be less expensive to erect but coyotes, dogs, and other wildlife can pass through electric fences. Electric fences must be maintained and tested regularly. Vegetation and fallen branches on the fence drain current, thus reducing efficacy. Also, dry soil conditions prevent grounding, and thus the animal can pass through the fence without being shocked. Electric fences also make the use of snares very difficult because of the reduced ability to detect where coyotes are passing through the fence.

**Temporary fencing** is placing temporary electric polytape fence in a bedding area to deter predation for a day to a week or more while the livestock producer moves the animals to another pasture or market. The livestock must be released each morning to feed and water. The temporary fence may need to be moved daily for various husbandry or livestock management reasons.

**Electronic guards (siren strobe-light devices)** are battery powered units operated by a photocell. The unit emits a flashing strobe light and siren call at regular intervals throughout the night. Efficacy of strobe-sirens is highly variable and less than three weeks (Linhart 1992). The device is a short-term tool used to deter predation until livestock can be moved to another pasture, brought to market, or other predator damage management methods implemented.

Virginia WS personnel maintain and distribute information on livestock guarding dogs and other nonlethal techniques. Livestock producers in Virginia employ many lethal and nonlethal management methods to reduce predator losses. In 1999, 105 livestock producers reported the use of 16 different nonlethal methods (Virginia WS unpub. MIS data). Therefore, requests for WS assistance to protect livestock from predation in Virginia in 1999 came from producers who were already using an average of 3.3 nonlethal methods on each operation, but still experienced predation problems in spite of these practices. The most frequently used nonlethal methods

were : 1) fencing barriers (conventional) 2) husbandry 3) fencing barriers (permanent electrical) and 4) guarding dogs (Virginia WS unpub. MIS data).

## MECHANICAL MANAGEMENT METHODS

Mechanical management methods consist primarily of tools or devices used to repel, capture or kill a particular animal or local population of wildlife to alleviate resource damage. All mechanical management methods can be used by livestock producers if they have the knowledge, ability, and time. Mechanical methods may be nonlethal (e.g., fencing, frightening devices, etc.) or lethal (e.g., snares, etc.). Some mechanical methods may be used as lethal or nonlethal methods (e.g., cage traps, leghold traps, snares (for dogs)). If WS personnel apply mechanical methods on private lands, an *Agreement for Control on Private Property* must be signed by the landowner or administrator authorizing the use of each damage management method. Mechanical methods used by WS include:

**Leg-hold traps** can be utilized to live-capture a variety of mammals, but are most often used within Virginia to capture coyotes, feral dogs, and red foxes. Three advantages of the leg-hold trap are: 1) they can be set under a wide variety of conditions, and 2) pan-tension devices can be used to reduce the probability of capturing smaller non-target animals (Turkowski et al. 1984, Phillips and Gruver 1996), and 3) non-target wildlife can be released. Effective trap placement and the use of appropriate lures by trained WS personnel also contribute to the leghold trap's selectivity.

Leg-hold traps are difficult to keep operational during inclement weather and they lack selectivity where non-target species are of a similar or heavier weight than the target species. The use of leg-hold traps also requires more time and labor than some methods, but they are indispensable in resolving many depredation problems.

Leg-hold traps are constantly being modified and tested to improve animal welfare of captured animals. The Best Management Practice (BMP) testing process and research has identified some leg-hold traps that have acceptable capture efficiency and low moderate-severe injury scores. This BMP process is ongoing and all traps which meet BMP standards will not be known until 2002. Leg-hold traps identified and used in the Virginia program include the use of a Woodstream Victor Number 3 padded-jaw modified with four-coils and reinforced base plate, and bubble-tip welded or turned jaws (Gruver et al. 1996); a Number 3 coil-spring offset with wide rounded-edge jaws (Sterling MJ600); and the J.C. Conner "Jake" padded-jaw trap. A similar steel jawed trap (Number 3 Bridger with laminated jaws and four-coils) tested by Canada passed the BMP process for capture efficiency and animal welfare will be used by the VCCDCP. As new leg-hold traps are developed, the VCCDCP may test and use these traps during VCCDCP activities.

**Cage traps**, typically constructed of wire mesh or plastic, are sometimes used or recommended to capture dogs. Cage traps pose minimal risks to humans, pets and non-target wildlife and allow for on-site release or relocation of dogs. Cage traps, however, cannot be used effectively to capture wary predators such as coyotes and red fox.

**Snares** may be used as either lethal or live-capture devices. They are placed wherever an animal moves through a restricted area (e.g., crawl holes under fences, trails through vegetation, etc.) and are easier to keep operational during periods of inclement weather than leg-hold traps. Snares set to catch an animal by the neck are usually lethal, while snares positioned to capture an animal around the body or leg can be a live-capture method. Careful attention to details when placing snares and the use of a "stop" on the cable can also allow for live-capture of neck-snared animals. Virginia WS incorporates "break-away" snares that allow larger non-target animals to break the snare and escape (Phillips 1996).

**Shooting** is selective for a target species and may involve the use of spotlights, night-vision, decoy dogs, and predator calling. Removal of one or two specific animals by calling and shooting in the problem area can sometimes provide immediate relief from a predation problem. This method is time consuming and inefficient in Virginia and therefore it is rarely used.

**Hunting dogs** are sometimes trained and used for coyote damage management to alleviate livestock depredation (Rowley and Rowley 1987, Coolahan 1990). Trained dogs are used primarily to find coyotes and dens and to pursue or decoy problem animals. Dogs could be essential to the successful location of coyote sign (tracks, hair, or droppings). Dogs are primarily used in Virginia to locate coyote sign.

**Denning** is the practice of finding coyote or red fox dens and eliminating the young, adults, or both to stop an ongoing predation problem or prevent future depredation on livestock. Till and Knowlton (1983) documented denning's cost-effectiveness and high degree of efficacy in resolving predation problems due to coyotes killing lambs in the spring. Coyote and red fox depredations on livestock often increase in the spring and early summer due to the increased food requirements associated with feeding and rearing litters of pups. Removal of pups will often stop depredations even if the adults are not taken (Till 1992). Pups are typically euthanized in the den using a registered gas fumigant cartridge (see discussion of gas cartridge under *Chemical Management Methods*). Coyote dens are rarely found in Virginia and this method is rarely used.

**Sport hunting and regulated trapping** can be and is part of a VCCDCP strategy to reduce local coyote or fox populations. Although WS does not use sport hunting and regulated trapping, it recommends, where appropriate, sport hunting and regulated trapping to alleviate coyote or fox damage. Hunters and trappers can provide a societal benefit by temporarily reducing local wild animal populations which can reduce damage. Coyotes are classified as nuisance species in Virginia and may be hunted anytime. Red and gray fox may be hunted November 1 through January 31 with dogs and gun, except in a few counties. Fox may be trapped for fur during the regulated trappings season from November 15 through February 28, except in a few counties. Coyotes may be trapped anytime. A hunting license is required to hunt fox and coyotes. A trapping license is required to trap fox and coyotes. There are some exceptions to license requirements for landowners. The VDGIF has specific regulations on license requirements.

## CHEMICAL MANAGEMENT METHODS

All chemicals used by WS to protect livestock are registered under the FIFRA and administered by the EPA and VDACS. All WS personnel in Virginia that use pesticides are certified as restricted-use pesticide applicators by the VDACS; the VDACS requires pesticide applicators to adhere to all certification requirements set forth in the FIFRA. Only WS employees can use M-44's and Livestock Protection Collars in Virginia. No chemicals are used on public or private lands without authorization from the land management agency or property owner or manager. The chemical methods used and/or available for use in Virginia are:

**Sodium cyanide in the M-44 device** - The M-44 can be used effectively during winter months when leg-hold traps are difficult to keep in operation and M-44s are typically more selective for target canid species. The M-44 is a spring-activated ejector device developed specifically to kill coyotes, although it is also registered with the EPA (EPA Reg No. 56228-15) to kill red fox and feral dogs. The M-44 consists of a capsule holder wrapped in an absorbent material, an ejector mechanism, a capsule containing about 0.9 grams of a powdered sodium cyanide mixture, a fluorescent marker, and a 6-7 inch hollow stake. To set a M-44, a suitable location is found, the hollow stake is driven into the ground, and the ejector unit is cocked and fastened into the stake by a slip ring. The wrapped capsule holder containing the cyanide capsule is

then screwed onto the ejector unit and an attractant is applied to the capsule holder. A canine attracted to the bait will try to bite and pick up the baited capsule holder. When the M-44 capsule holder is pulled, the spring-activated plunger propels sodium cyanide into the animal's mouth, resulting in a quick death. Coyotes killed by M-44s present no secondary poisoning risks (USDA 1997revised, Appendix P, pgs. 269-271). Bilingual (English-Spanish) warning signs are posted at major entries into the area where M-44s are placed, and two bilingual warning signs are placed within 25 feet to warn of each device's presence.

The M-44 is very selective for canids because of the attractants used and because the device is triggered by pulling upward. Connolly (1988), in an analysis of M-44 use by the WS program from 1976-1986, documented about a 95.3% selectivity rate for target species. In Virginia, M-44's have a selectivity rate of 83.5% for target species. Domestic dogs are susceptible to M-44s, and this limits the areas where the devices can be safely used (see SOPs in Chapter 3). In addition, the 26 EPA use restrictions preclude the use of M-44s in areas where they may pose a danger to T&E species.

M-44s are used for corrective and preventive damage management on all land classes where authorized. WS personnel comply with the EPA label and 26 use restrictions (see USDA 1997revised, Appendix Q).

**Livestock Protection Collars (LPC)** are registered with the EPA (Reg. No. 56228-22) and is registered for use on sheep or goats to kill depredating coyotes. The LPC consists of a rubber collar with two rubber reservoirs, each of which contains 15 milliliters of a 1-percent solution of sodium fluoroacetate (Compound 1080). The LPC has Velcro straps for attachment around the neck of a sheep or goat with the reservoirs positioned just behind the jaw. Two sizes of collars are available to accommodate various size livestock.

Coyotes typically attack sheep and goats by biting them on the throat and crushing the larynx, causing suffocation. Coyotes that attack collared sheep generally puncture the collar (in 75% or more of attacks) with their teeth and receive a lethal oral dose of toxicant.

Use of the LPC involves the establishment of a "target flock" of 20-50 collared lambs and their ewes. These animals are placed in a high risk pasture where recent coyote attacks have occurred. Other (uncollared) livestock on the farm are moved to a safe area or are penned until predation stops.

The greatest advantage of the LPC is its selectivity. Only coyotes causing damage are killed. Disadvantages of the collar include the death of some collared livestock by coyotes, time and cost of certification required to use collars, potential hazards associated with the toxicant under field conditions, expense of collaring and monitoring target animals, mandatory record keeping, and management efforts needed to protect livestock displaced from the target flock's location.

Numerous restrictions apply to the use of LPC's and are specified in the EPA approved LPC technical bulletin which is part of the restricted use pesticide label. In Virginia, only certified WS personnel are allowed to use LPC's. Lowney (1996) provides instruction for certification of LPC applicators. LPC applicators must pass a written exam administered by VDACS to be certified applicators.

The **Large Gas Cartridge** is registered as a fumigant by the EPA (Reg. No. 56228-21) and is used in conjunction with denning operations in Virginia. When ignited, the cartridge burns in the den of an animal and produces large amounts of carbon monoxide, a colorless, odorless, and tasteless, poisonous gas. The combination of oxygen depletion and carbon monoxide exposure kills the animals in the den. Carbon monoxide euthanasia is recognized by the AVMA as an approved and humane method to kill animals (AVMA 2001).